

Spot Safety Project Evaluations



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North Carolina DOT - Traffic Safety Unit

2008 Traffic Conference for Mobility and Safety

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Spot Safety Evaluations

- Currently have 324 Spot Safety Project Evaluations located on the Web
 - Projects staff completed through March 31, 2008
 - Projects from Program Years: 1997 through 2002

Safety Evaluation Group - Completed Projects

Project Evaluations:	<input type="button" value="+"/>
Work Zone Evaluations:	<input type="button" value="+"/>
Spot Safety Evaluations:	<input type="button" value="+"/>
Hazard Elimination:	<input type="button" value="+"/>

<http://www.ncdot.org/doh/preconstruct/traffic/safety/ses/projects/completed.html>

Spot Safety Evaluations

- Spot Safety Evaluations Tab on Web:
 - Alphabetical order by safety countermeasure type
 - Numerical order by the spot safety number

Curve Wedging and Resurfacing

- SS 06-94-201 Bladen - NC 87, 0.5 miles Southeast of SR 1712 (Libson)
- SS 06-96-207 Harnett - US 401 from SR 2019 to SR 2035
- SS 08-98-400 Richmond - SR 1423 at SR 1436

Draining Improvements

- NEW!** SS 12-01-224 Gaston - I-85 From Milepost 9.28 to Milepost 10.28

Emergency Actuated Flashing Traffic Signal

- SS 11-95-005 Watauga - NC 105 at Foscoe Fire Station

Flashing Traffic Signal

- SS 02-96-226 Greene - US 13 at SR 1210 / SR 1132 (Shine / Free Gospel)
- NEW!** SS 04-01-217 Wayne - NC 111 (Patetown) at SR 1547 (Stoney Creek Church)
- NEW!** SS 04-01-243 Johnston - NC 96 at SR 1143 (Stricklands Crossroads)

Offset Left Turn Lane

- SS 02-99-207 Pitt - US 264 at SR 1579 / SR 1612
- NEW!** SS 03-01-213 New Hanover - US 421 (Carolina Beach) at SR 1524 (Golden) / Masonboro Commons Shopping Center
- NEW!** SS 03-99-204 New Hanover - US 421 (Carolina Beach) at SR 1576 (River) / SR 1531 (Seabreeze)

Resurfacing

- SS 02-94-229 Pitt - NC 43 Westbound from 0.30 Miles East of SR 1750 to Near SR 1750
- SS 02-96-241 Carteret - US 70 Western Approach to Bridge over Newport River
- SS 04-96-018 Wayne - US 70 Westbound from SR 1241 to SR 1327
- SS 11-00-213 Yadkin - US 421 Northbound From 0.19 Miles South of SR 1711 to SR 1710

Right Turn Lane

- NEW!** SS 02-99-208 Beaufort - US 264 (Pactolus) at SR 1409 (Wharton Station)
- SS 07-00-201 Alamance - SR 1158 (Huffman Mill) at I-40 Westbound / I-85 Southbound Exit Ramp

Roundabout

- NEW!** SS 05-00-208 Durham - NC 751 at SR 1307 (Old Erwin)
- SS 11-00-210 Wilkes - SR 1716 / SR 1713 (Yellowbanks) at SR 1716 / SR 1707 (Haymeadow)

<http://www.ncdot.org/doh/preconstruct/traffic/safety/ses/projects/completed.html>

Spot Safety Evaluations

- Why Evaluate?
 - Need to know if countermeasures we implement actually work
 - Typical way this is measured: “If phone stops ringing, treatment worked”
 - Need good safety data to make informed decisions
 - Spend limited taxpayer money wisely
- Spot Safety Evaluations – Topic Oriented Focus
 - Directional Crossovers (8 sites)
 - Traffic Signal – Signal Revisions (6 sites)
 - Traffic Signal – New Installations (3 sites)

Directional Crossover - 1

- Location:
 - US 401 (Raeford Road) at SR 1546 (Little Drive) in Cumberland County || SS # 06-95-201
- Problem Statement:
 - Severe traffic accident patterns occurred at the crossover as a result of vehicles attempting to maneuver through heavy traffic volumes
- Countermeasure:
 - Installation of a Directional Crossover
 - Cost: \$75,000
 - Project completion - March 31, 1997
 - 7 Years - Before and After Data

Directional Crossover - 1

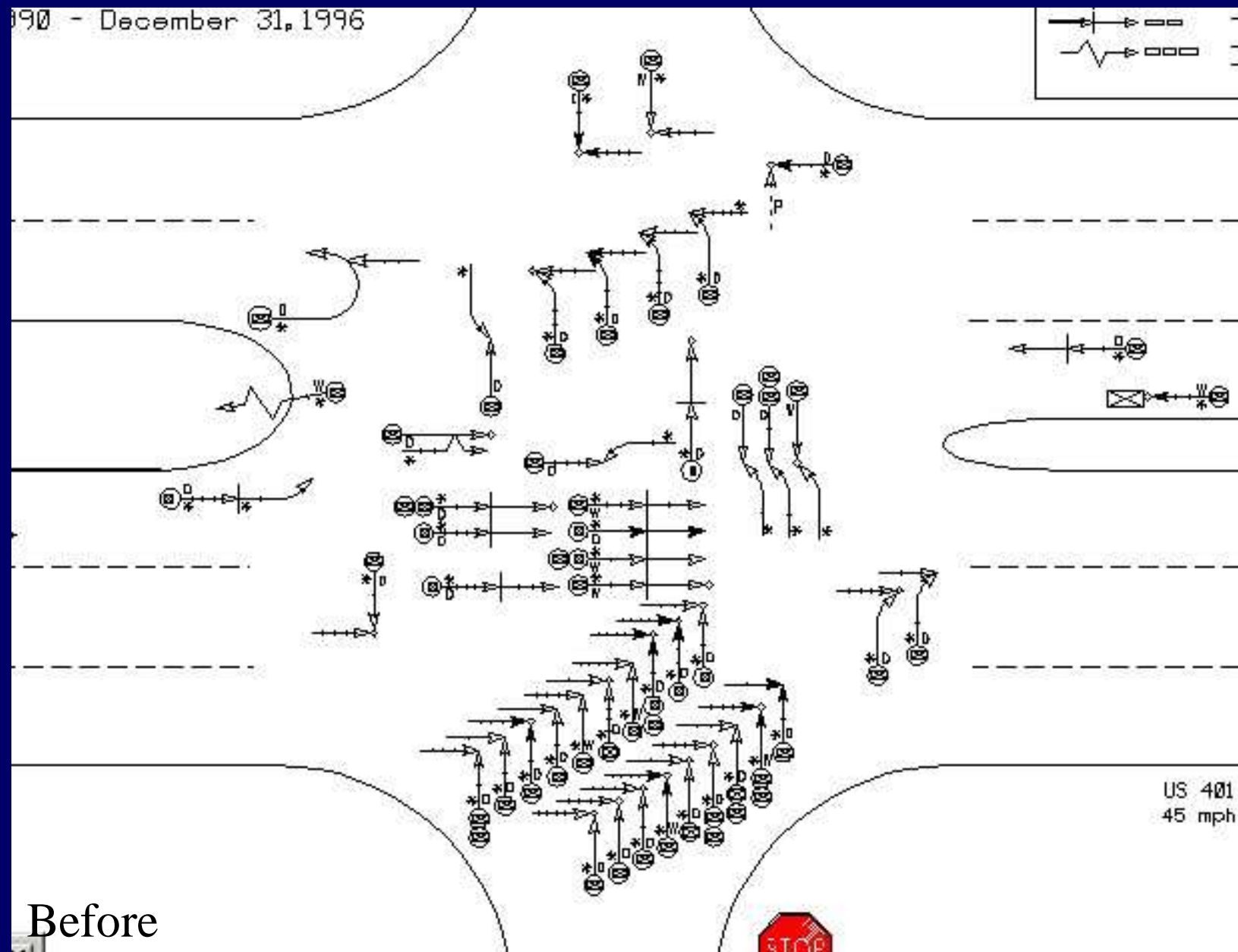


Directional Crossover - 1

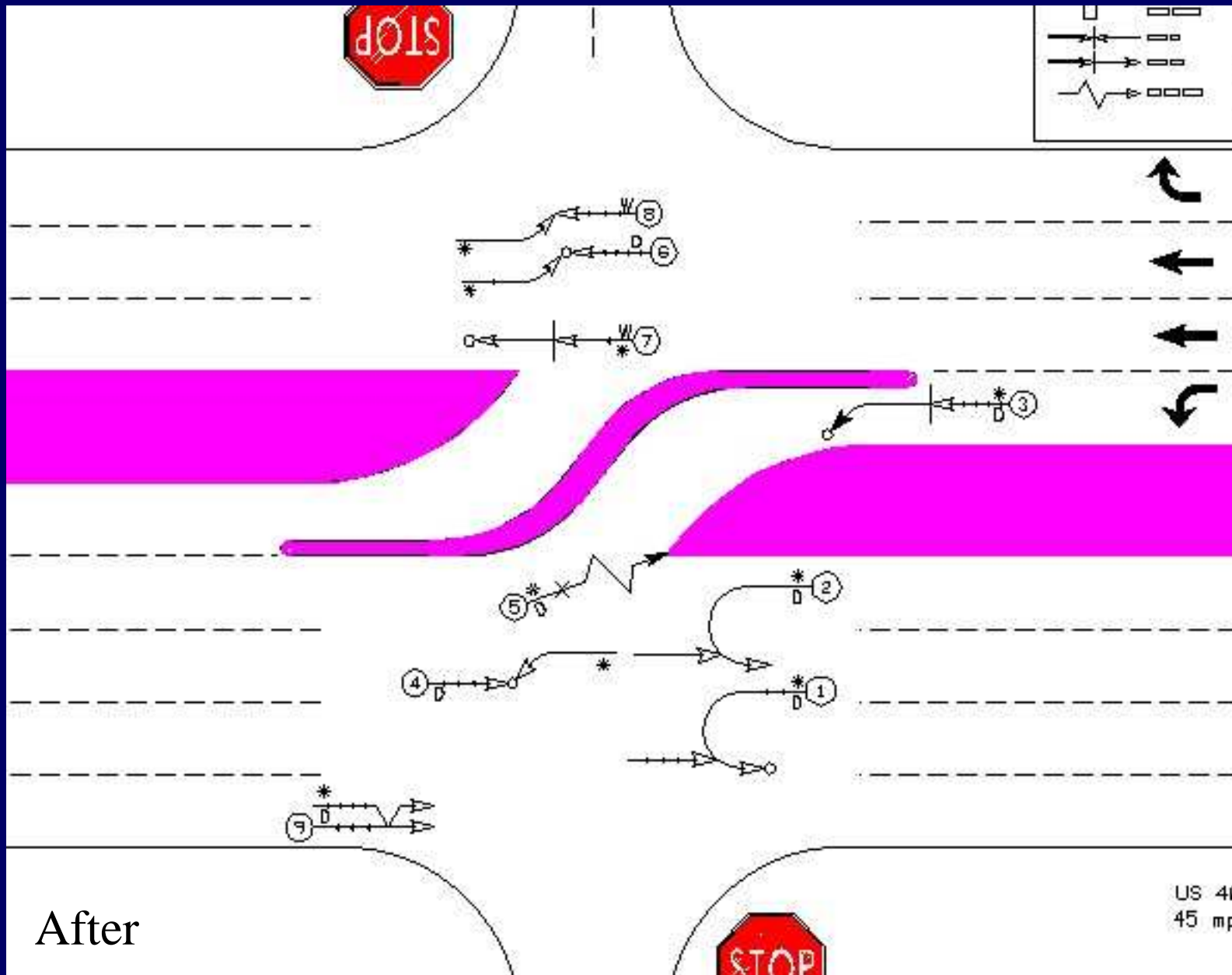


Directional Crossover - 1

1990 - December 31, 1996



Directional Crossover - 1



Directional Crossover - 1

Overall Total Crash Summary within Treatment Influence Area

	Before	After	Percent Reduction (-)/ Percent Increase (+)
Treatment Intersection	56	8	- 85.7
US 401-Raeford Road at SR 1141-Bingham Road	154	138	- 10.4
US 401-Raeford Road at SR 1411-Bunce Road	83	54	- 34.9
US 401-Raeford Road Section	390	243	- 37.7

Directional Crossover - 2

- Location:
 - US 29-70/I 85 Business at SR 1774 (Mendenhall Street) in Davidson County || SS # 09-99-228
- Problem Statement:
 - Angle Crashes were occurring due to vehicles crossing a high volume road
- Countermeasure:
 - Installation of a Directional Crossover
 - Cost: \$65,000
 - Project completion - July 31, 2002
 - 3 Years and 9 Months - Before and After Data

Directional Crossover - 2



Directional Crossover - 2

Looking East



Looking South

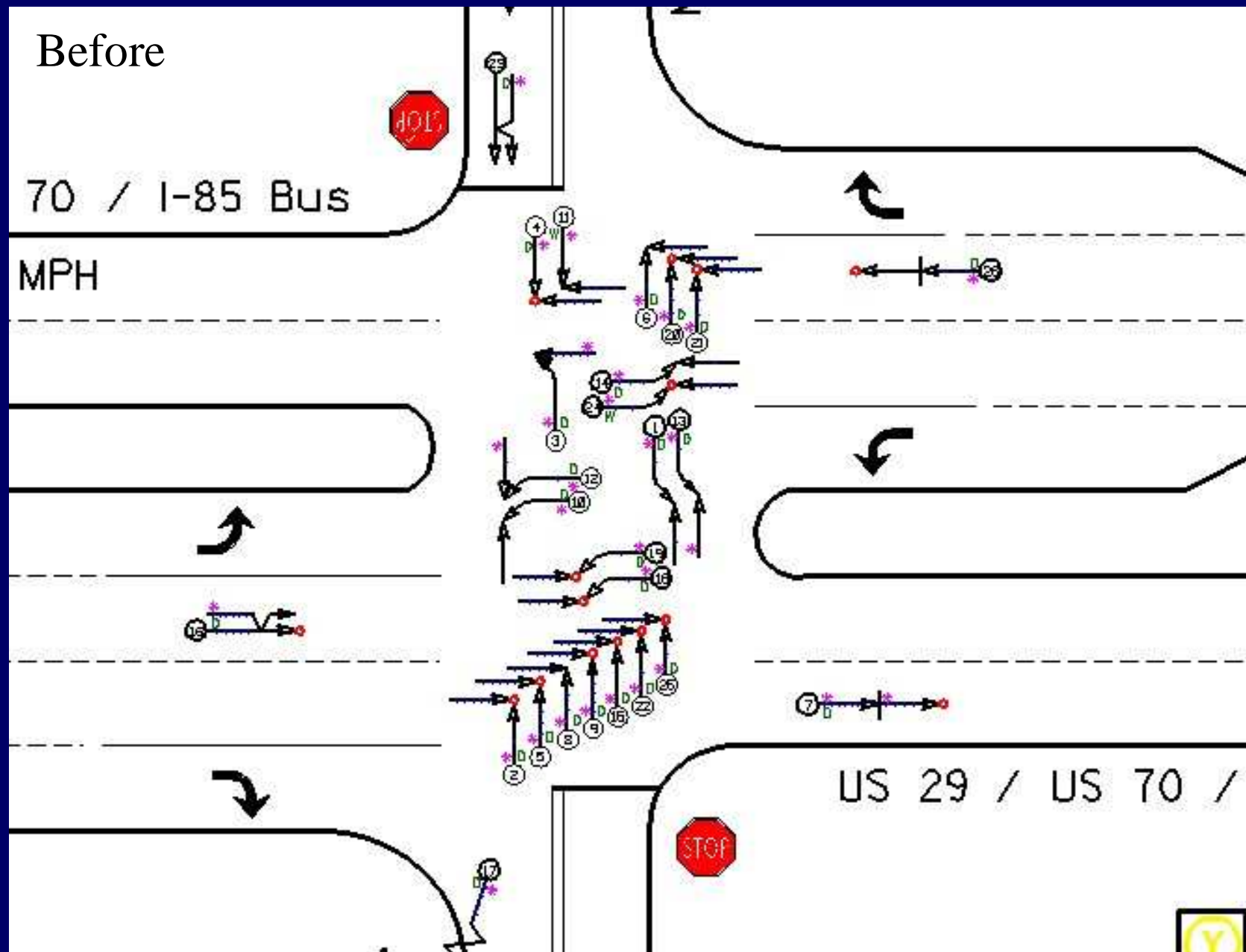


Directional Crossover - 2

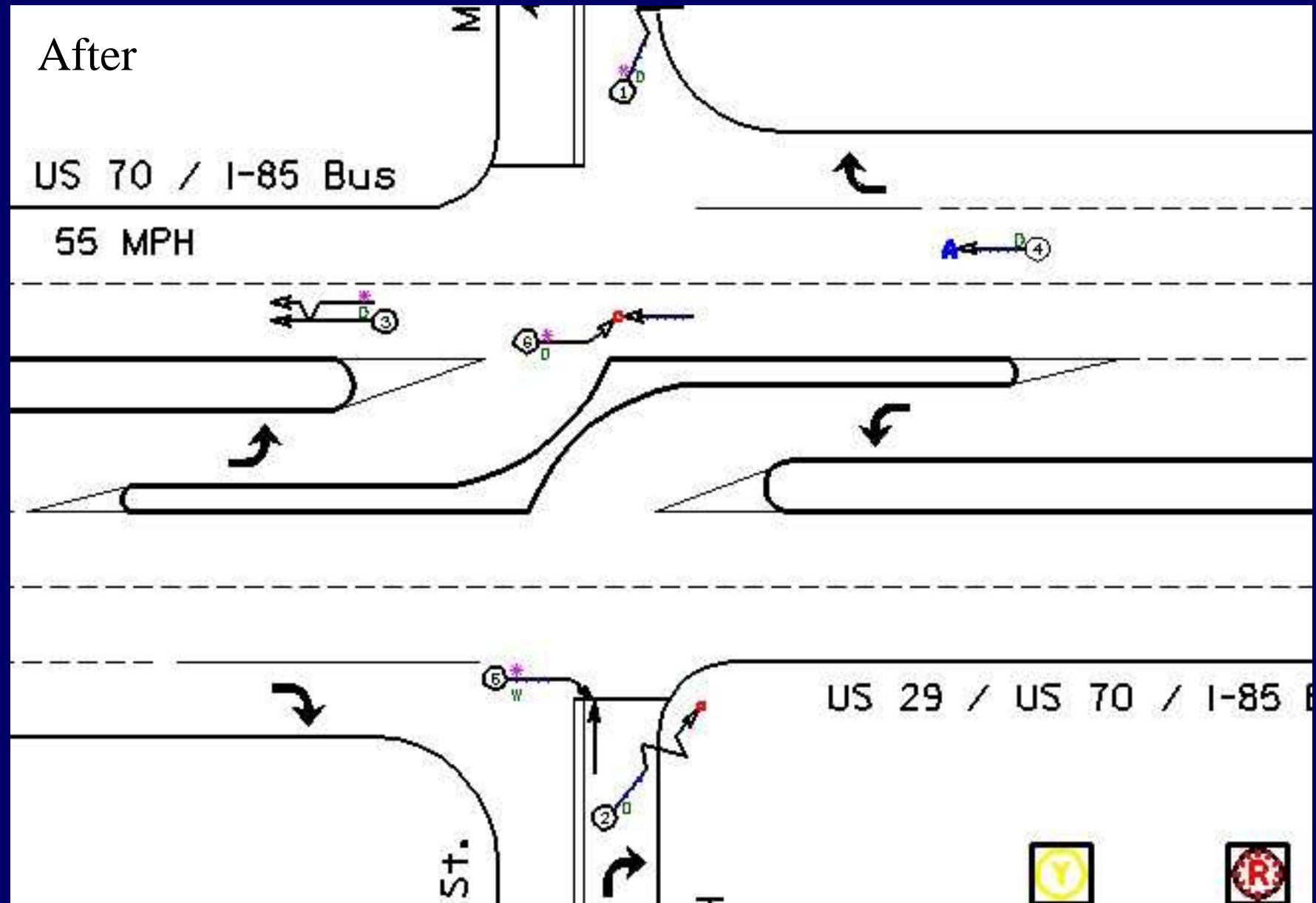
Before

70 / I-85 Bus

MPH



Directional Crossover - 2



Directional Crossover - 2

Treatment Information

	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	26	6	- 76.92 %
Total Severity Index	5.27	4.70	- 10.82 %
Frontal Impact Crashes	21	2	- 90.48 %
Frontal Severity Index	5.23	4.70	- 10.13 %
Volume	21,800	23,000	5.50 %

Treatment Injury Crashes

	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal	0	0	N/A
Class A	0	0	N/A
Class B	5	2	- 60.00 %
Class C	10	1	- 90.00 %
Property Damage Only	11	3	- 72.73 %

Frontal Injury Crashes

	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal	0	0	N/A
Class A	0	0	N/A
Class B	3	0	- 100.00 %
Class C	9	1	- 88.89 %
Property Damage Only	9	1	- 88.89 %

Directional Crossover - 3

- Location:
 - US 64 and SR 2234/SR 2500 (Mark's Creek Road) in Wake County
|| SS # 05-99-243
- Problem Statement:
 - Vehicles could not enter the intersection safely due to insufficient gaps in traffic
 - Would reduce the number of crashes at the intersection with minimal impact on traffic progression
- Countermeasure:
 - Installation of a Directional Crossover
 - Cost: \$33,000
 - Project completion - November 30, 2001
 - 3 Years - Before and After Data

Directional Crossover - 3



Directional Crossover - 3

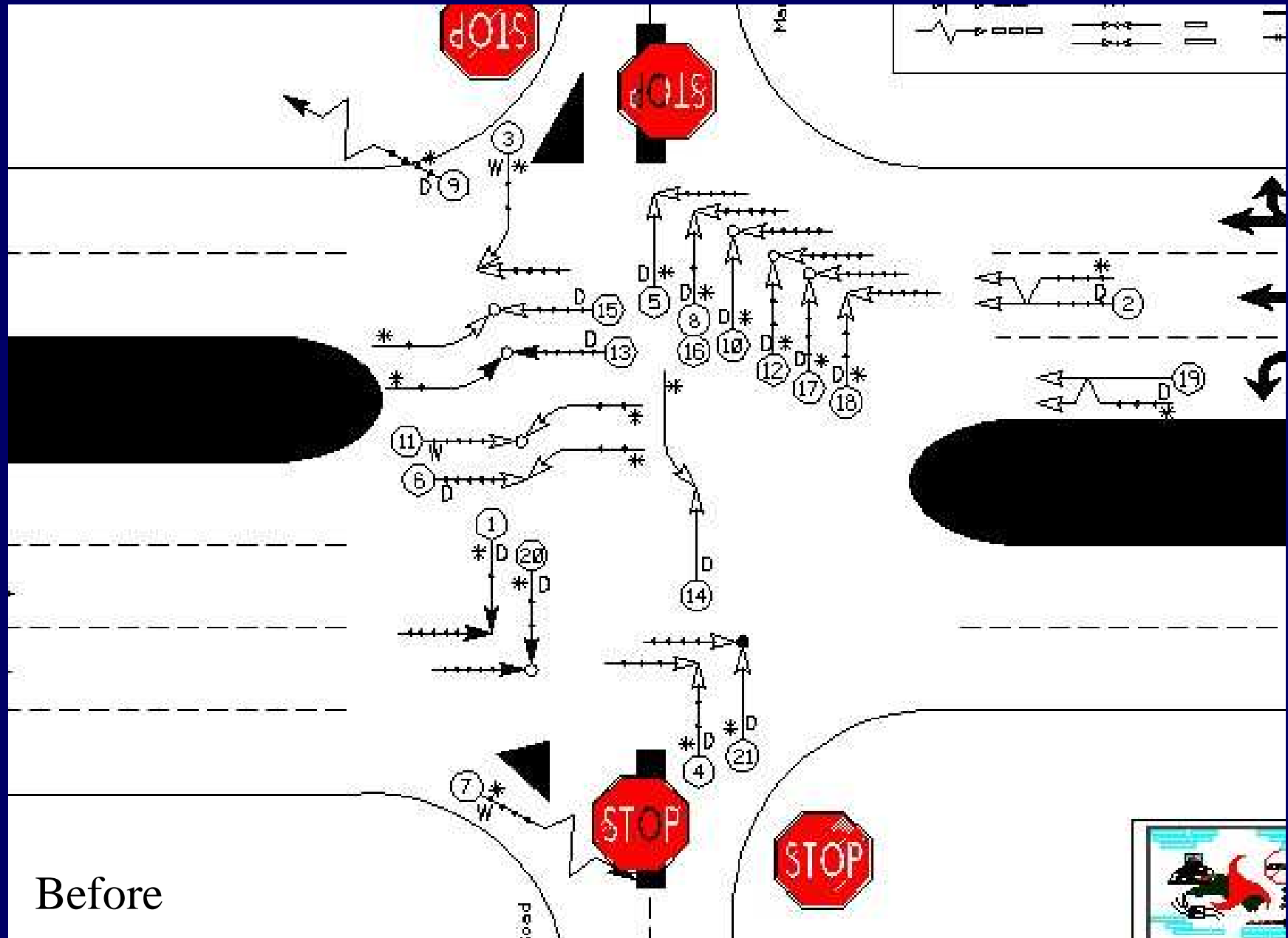
Looking East



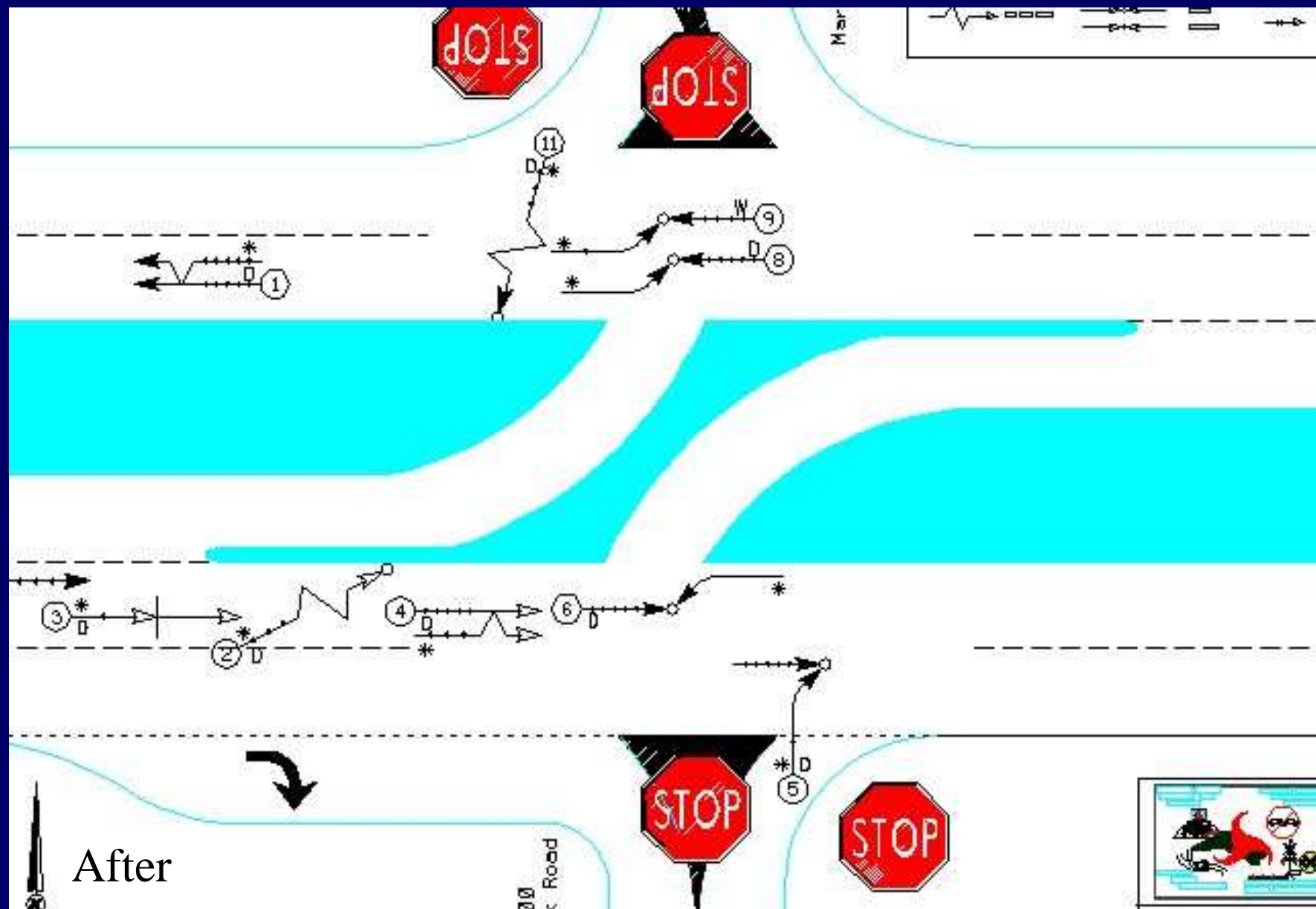
Looking West



Directional Crossover - 3



Directional Crossover - 3



Directional Crossover - 3

Treatment Information

	Before	After	Percent Reduction (-)/ Percent Increase (+)
Total Crashes	21	11	- 47.6
Total Severity Index	7.08	11.25	58.9
Frontal Impact Crashes	17	4	- 76.5
Frontal Severity Index	8.51	25.50	199.6
Volume	45,000	47,600	5.8

Directional Crossover - 4

- Location:
 - US 264 (Greenville Blvd) and SR 1523 (Whichard Road) in Pitt County || SS # 02-94-216
- Problem Statement:
 - Vehicles using westbound SR 1523 as a shortcut to NC 33
 - Once vehicles entered crossover, they proceeded across the intersection through inadequate gaps
- Countermeasure:
 - Installation of a Directional Crossover
 - Cost: \$65,000
 - Project completion - April 30, 1999
 - 5 Years and 4 Months - Before and After Data

Directional Crossover - 4



Directional Crossover - 4

Looking South

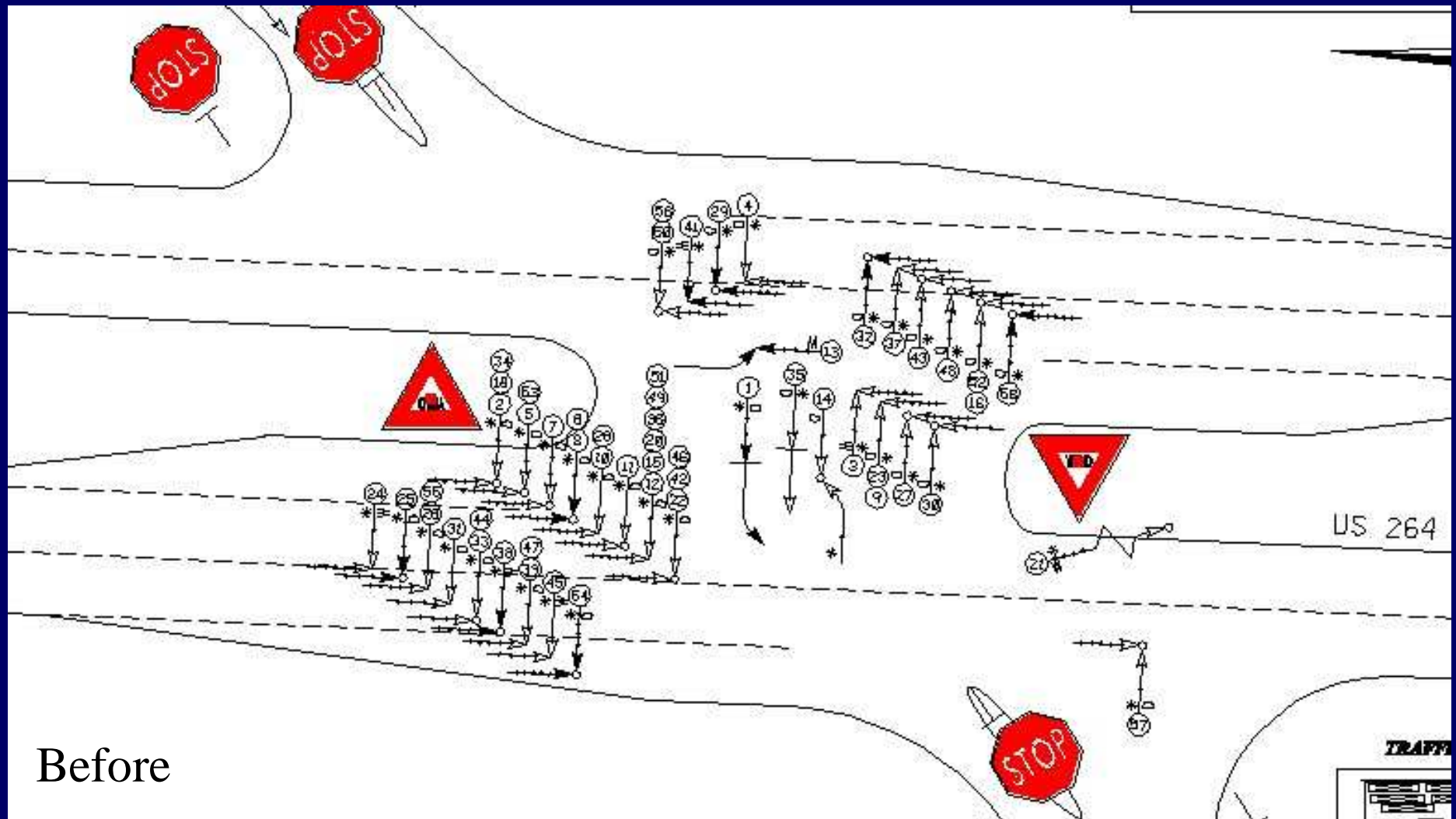


Looking North

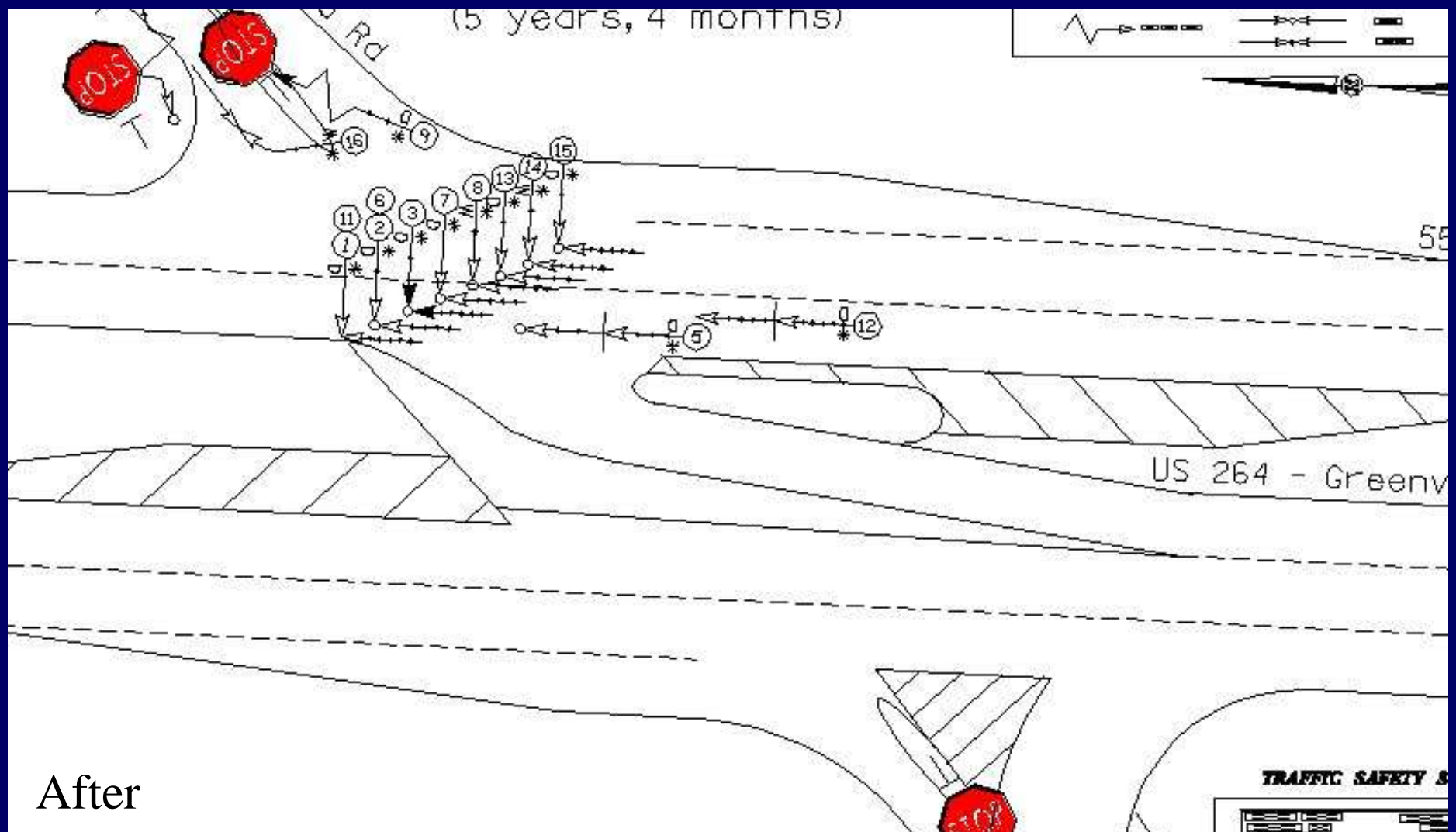


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Directional Crossover - 4



Directional Crossover - 4



Directional Crossover - 4

Treatment Information

	Before	After	Percent Reduction (-)/ Percent Increase (+)
Total Crashes	58	16	- 72.4
Total Severity Index	7.44	5.62	- 24.5
Angle Crashes	50	10	- 80.0
Angle Severity Index	8.03	6.92	- 13.8
Volume	19,600	22,000	12.2

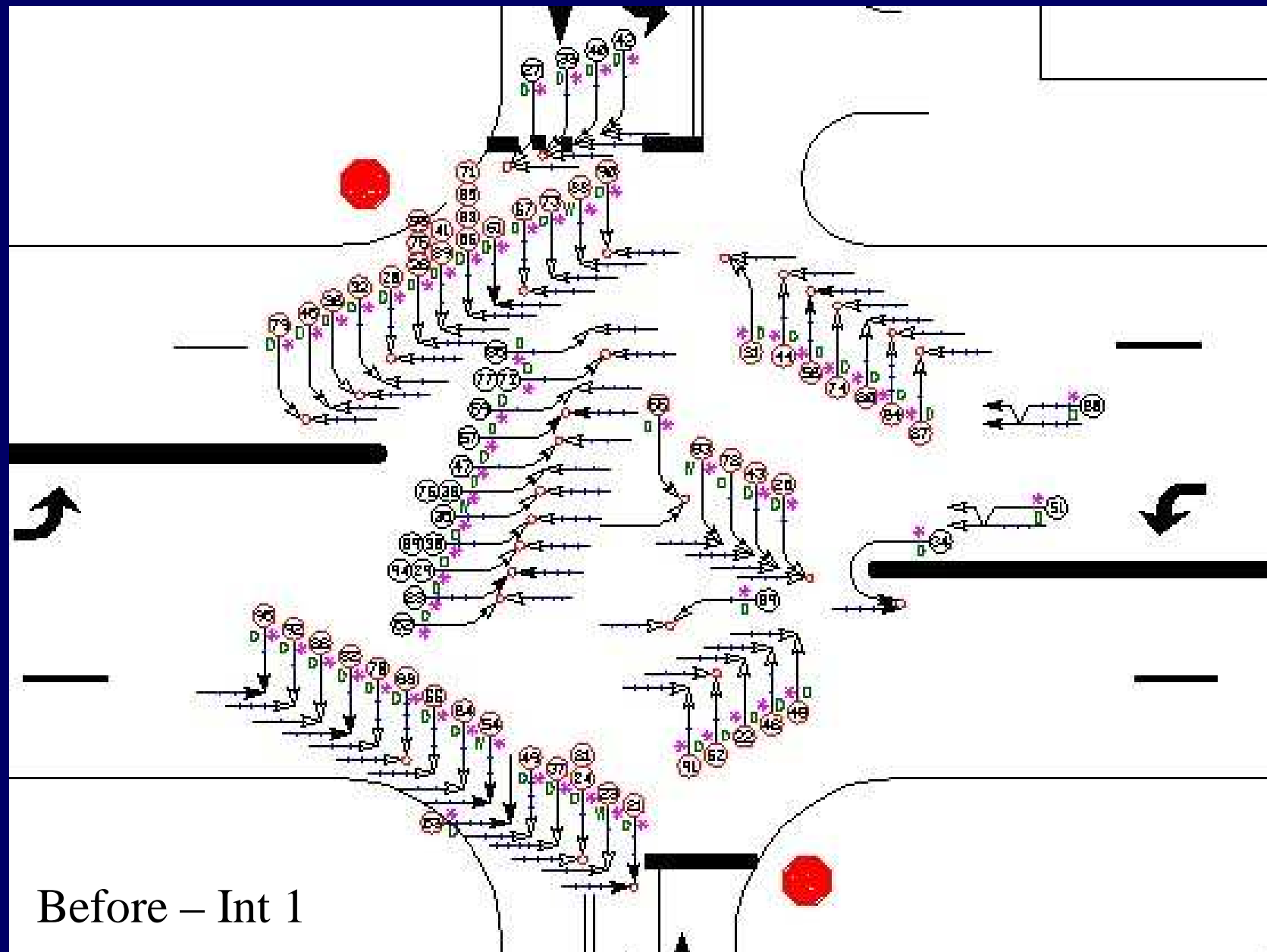
Directional Crossover - 5

- Location:
 - SR 1223 (Dickerson Blvd) from US 74 to Commerce Drive in Union County || SS # 10-02-200
- Problem Statement:
 - Vehicles entering and crossing a high volume multilane roadway at various points, resulting in a high number of angle collisions and congestion
- Countermeasure:
 - Installation of a Directional Crossover, Median Channelization, and a Traffic Signal
 - Cost: \$105,000
 - Project completion – December 12, 2002
 - 3 Years and 11 Months - Before and After Data

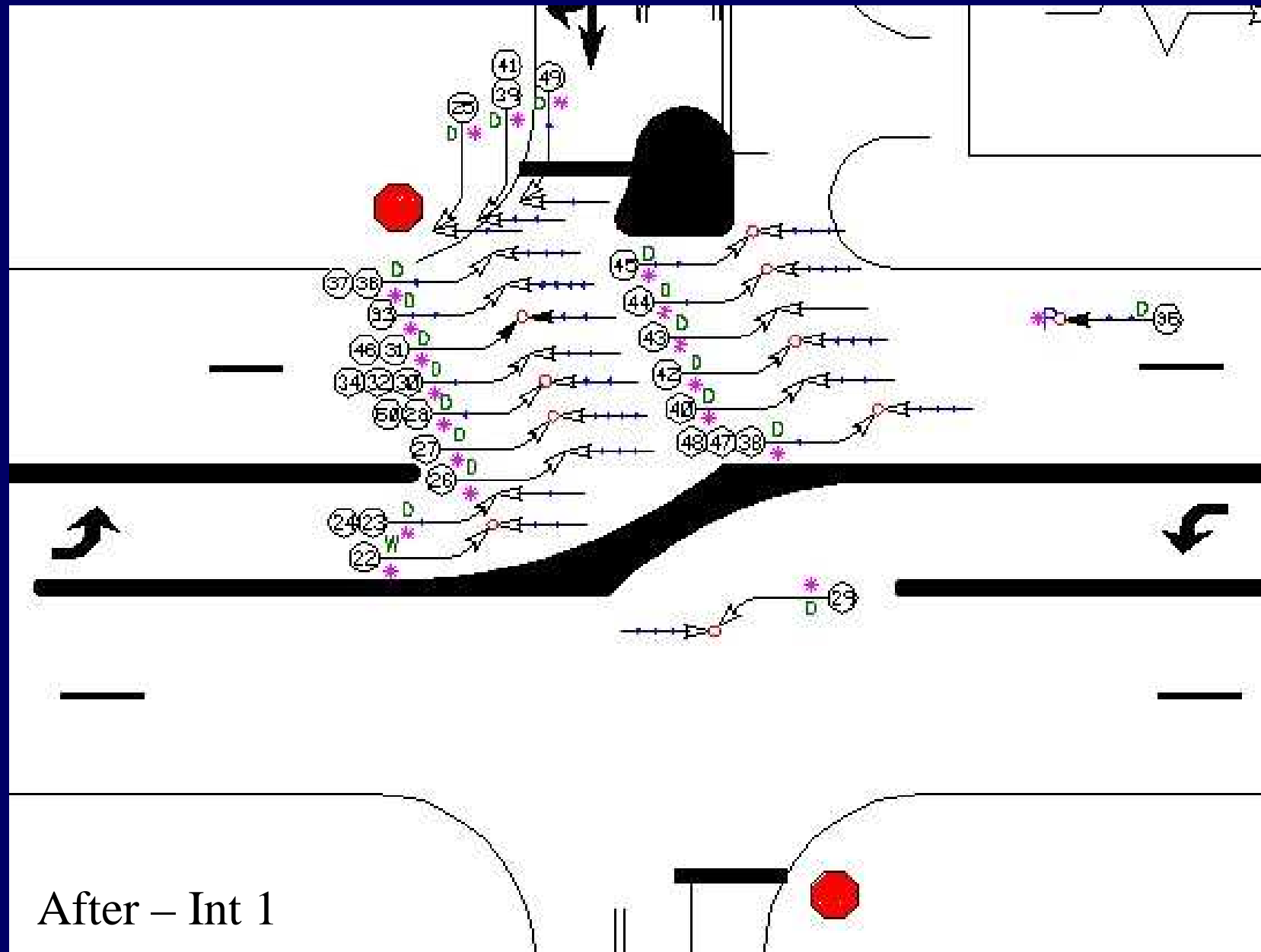
Directional Crossover - 5



Directional Crossover - 5



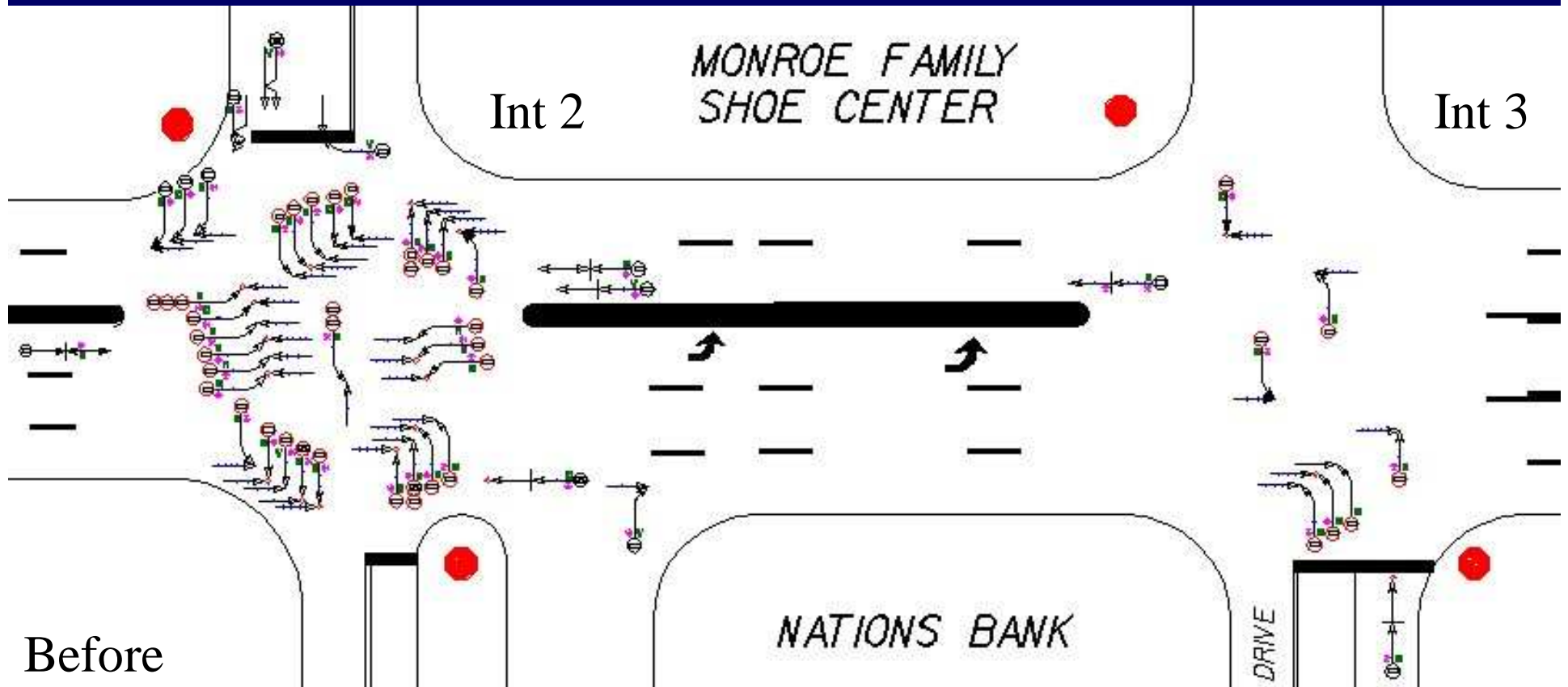
Directional Crossover - 5



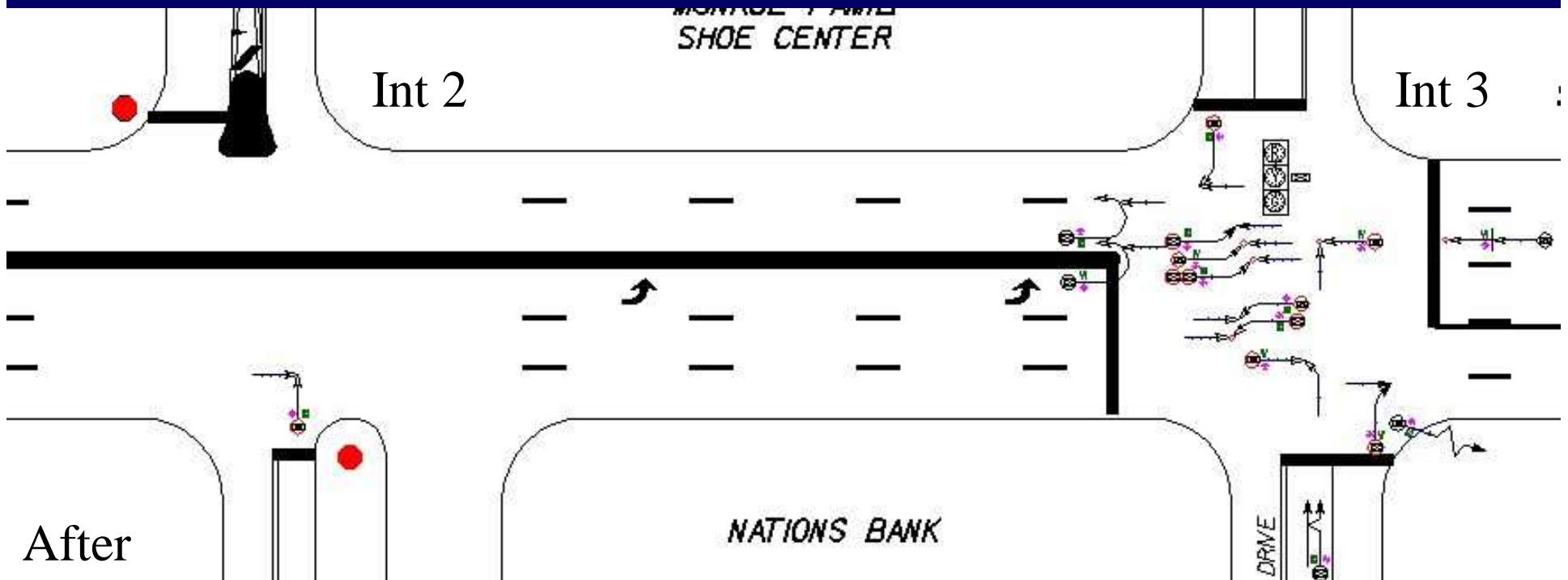
Directional Crossover - 5

	Before Period	After Period	Percent Reduction (-)/ Percent Increase (+)
Total Crashes	75	29	-61.3
Total Severity Index	4.16	6.93	66.6
Target Crashes	52	0	-100.0
Target Severity Index	3.56	N/A	N/A

Directional Crossover - 5



Directional Crossover - 5



Directional Crossover - 5

Int 2	Before Period	After Period	Percent Reduction (-)/ Percent Increase (+)
Total Crashes	44	1	-97.7
Total Severity Index	4.03	1	-75.2
Target Crashes	33	1	-97.0
Target Severity Index	4.81	1	-79.2

Int 3	Before Period	After Period	Percent Reduction (-)/ Percent Increase (+)
Total Crashes	9	15	66.7
Total Severity Index	3.47	3.96	14.1
Target Crashes	7	10	42.9
Target Severity Index	3.11	4.7	51.1

Directional Crossover - 6

- Location:
 - SR 4315 (South Main Street) at Century Blvd in Forsyth County || SS # 09-99-218
- Problem Statement:
 - High volume of traffic on mainline, vehicles attempt left turns from the side road resulting in a high number of crashes
- Countermeasure:
 - Installation of a Directional Crossover
 - Cost: \$55,000
 - Project completion - June 30, 2000
 - 5 Years and 7 Months - Before and After Data

Directional Crossover - 6



Directional Crossover - 6

Looking East on Main



Looking East on Main



Looking East on Main

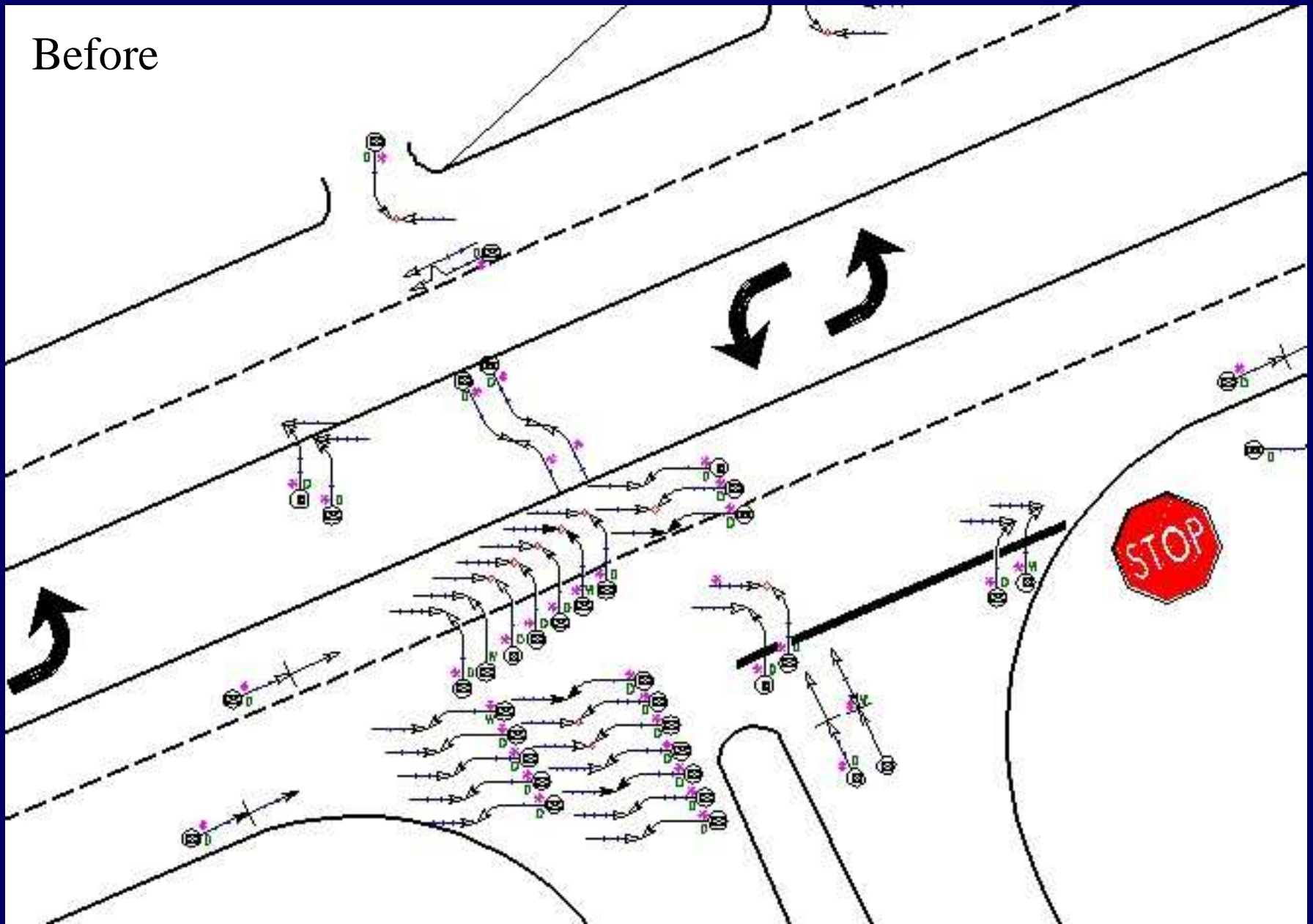


Looking West on Main

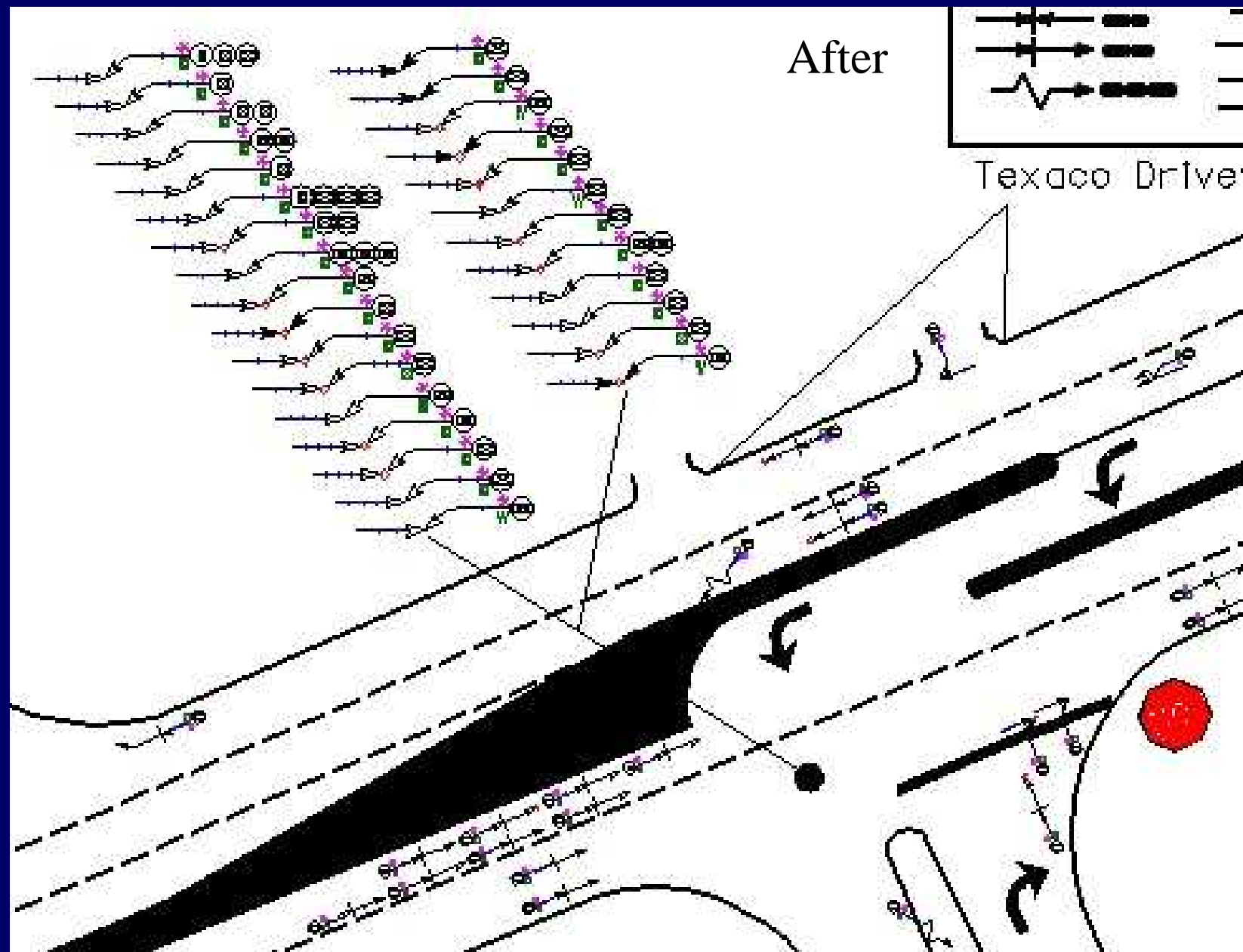


Directional Crossover - 6

Before



Directional Crossover - 6



Directional Crossover - 6

Results

Treatment Information

	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	45	70	55.6
Total Severity Index	3.1	4.5	42.3
Frontal Impact Crashes	33	43	30.3
Frontal Severity Index	3.4	5.5	62.5
Volume	13400	17000	26.9

Treatment Injury Crashes

	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal	0	1	N/A
Class A	0	0	N/A
Class B	5	4	-20.0
Class C	8	19	137.5
Property Damage Only	32	46	43.8

Frontal Injury Crashes

	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal	0	1	N/A
Class A	0	0	N/A
Class B	5	3	-40.0
Class C	6	13	116.7
Property Damage Only	22	26	18.2

Directional Crossover - 6



Directional Crossover - 6



Directional Crossover - 7

- Location:
 - US 158 at Burke Mill Road in Forsyth County || SS # 09-98-219
- Problem Statement:
 - Congestion and high volume of traffic at the intersection, where vehicles attempt left turns from the side road resulting in high number of crashes at the location
- Countermeasure:
 - Installation of a Directional Crossover
 - Cost: \$30,000
 - Project completion - April 9, 1999
 - 6 Years and 10 Months - Before and After Data

Directional Crossover - 7



Directional Crossover - 7

Looking South on US 158



Looking South on US 158



Looking South on US 158



Looking South on US 158



Directional Crossover - 7

Looking North on US 158



Looking North on US 158



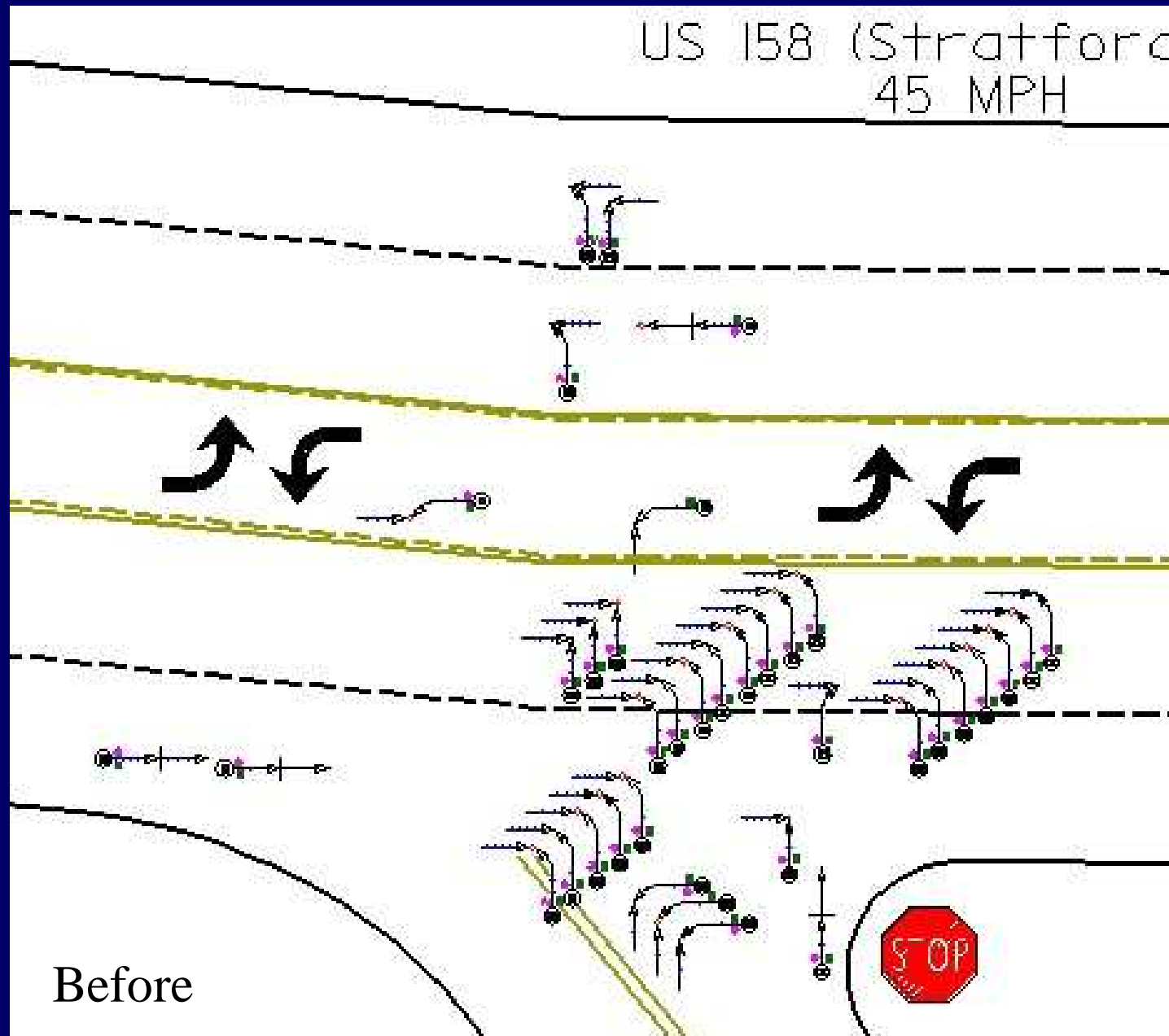
Looking North on US 158



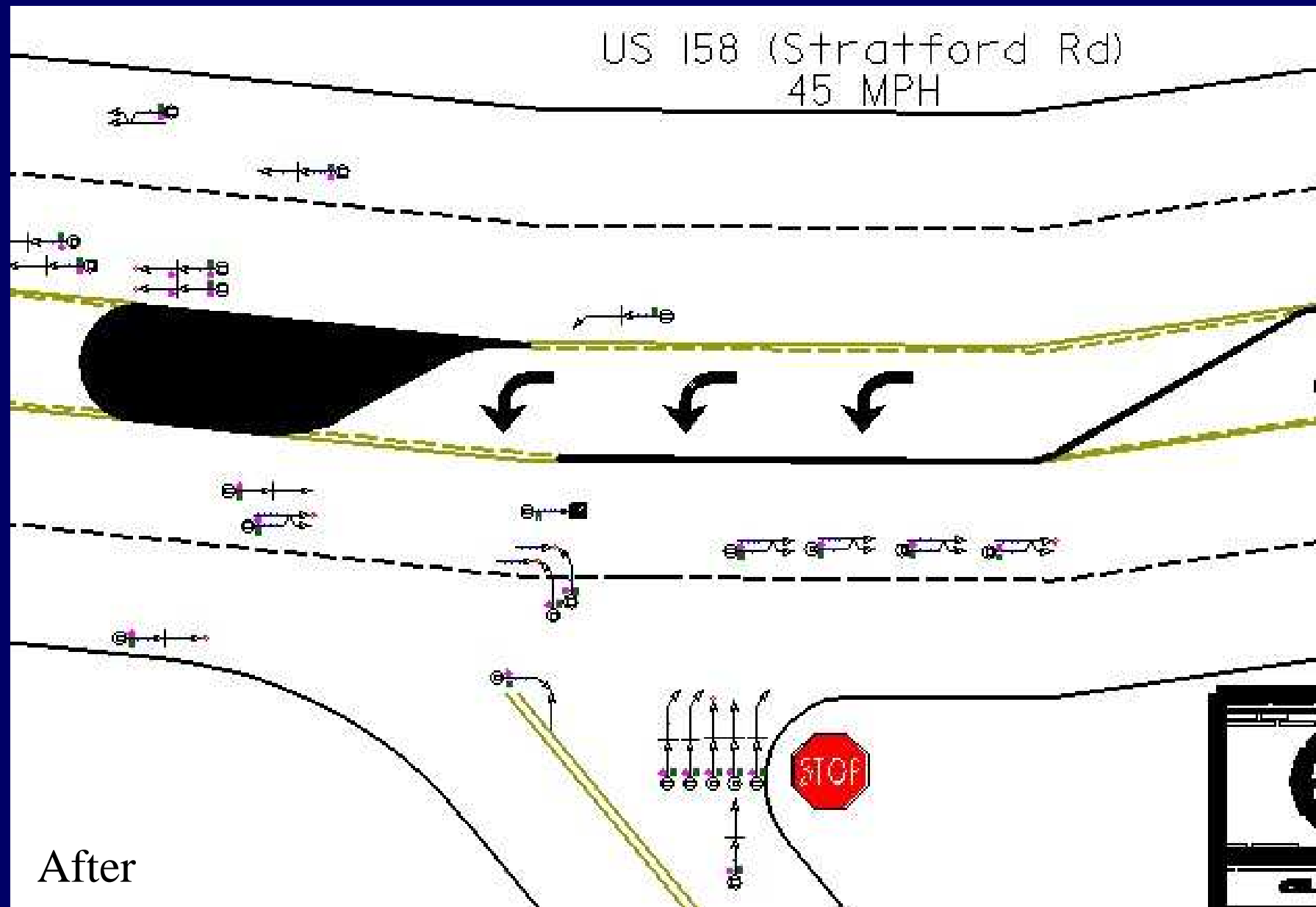
Looking North on US 158



Directional Crossover - 7



Directional Crossover - 7



Directional Crossover - 7

Results

<u>Treatment Information</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Total Crashes	37	26	-29.7
Total Severity Index	12.2	3.8	-68.5
Frontal Impact Crashes	33	4	-87.9
Frontal Severity Index	11.3	6.6	-41.8
Volume	22000	29400	33.6
<u>Treatment Injury Crashes</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal	1	0	-100.0
Class A	3	0	-100.0
Class B	5	2	-60.0
Class C	10	8	-20.0
Property Damage Only	18	16	-11.1
<u>Frontal Injury Crashes</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal	1	0	-100.0
Class A	2	0	-100.0
Class B	5	0	-100.0
Class C	10	3	-70.0
Property Damage Only	15	1	-93.3

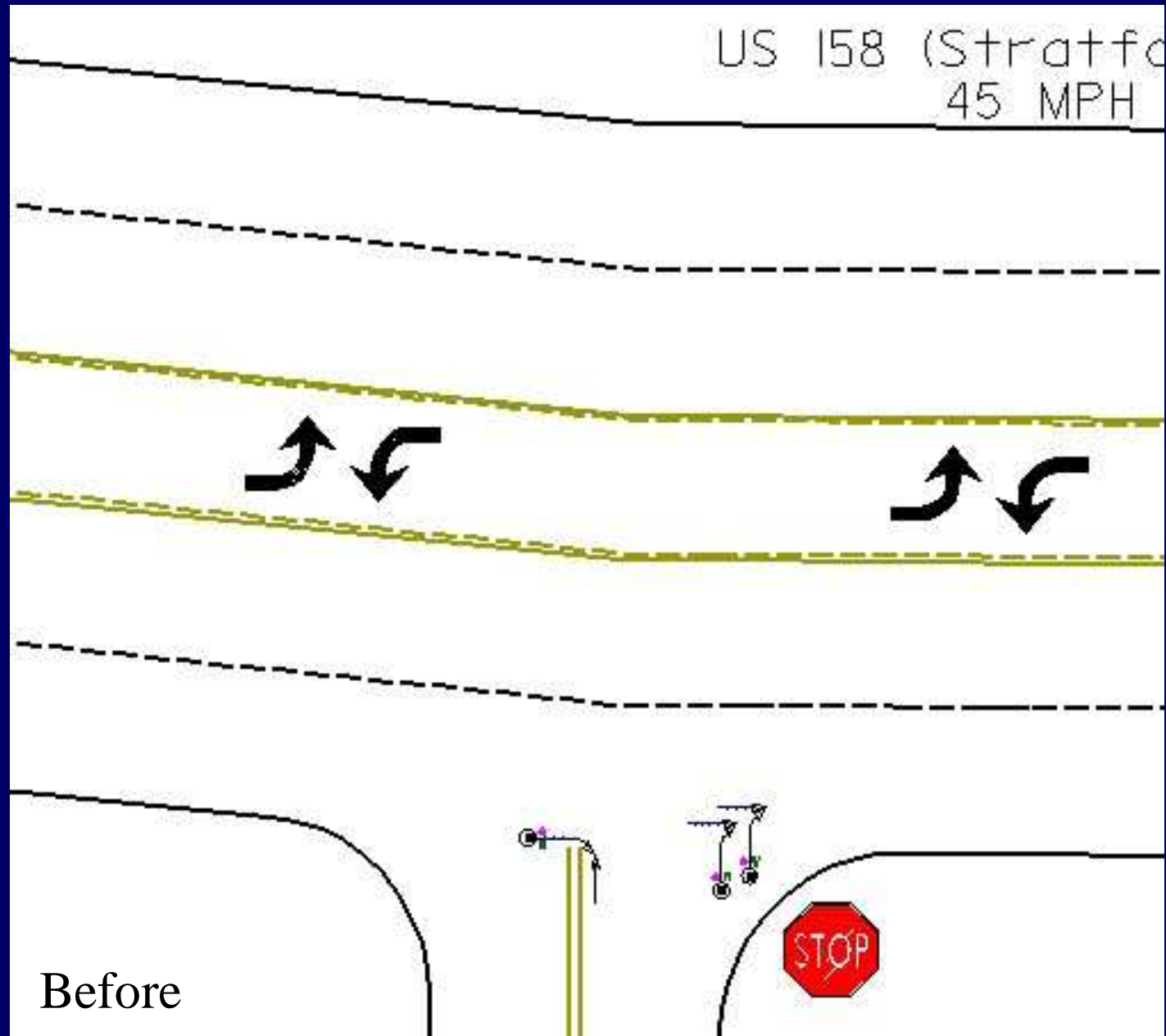
Directional Crossover - 7



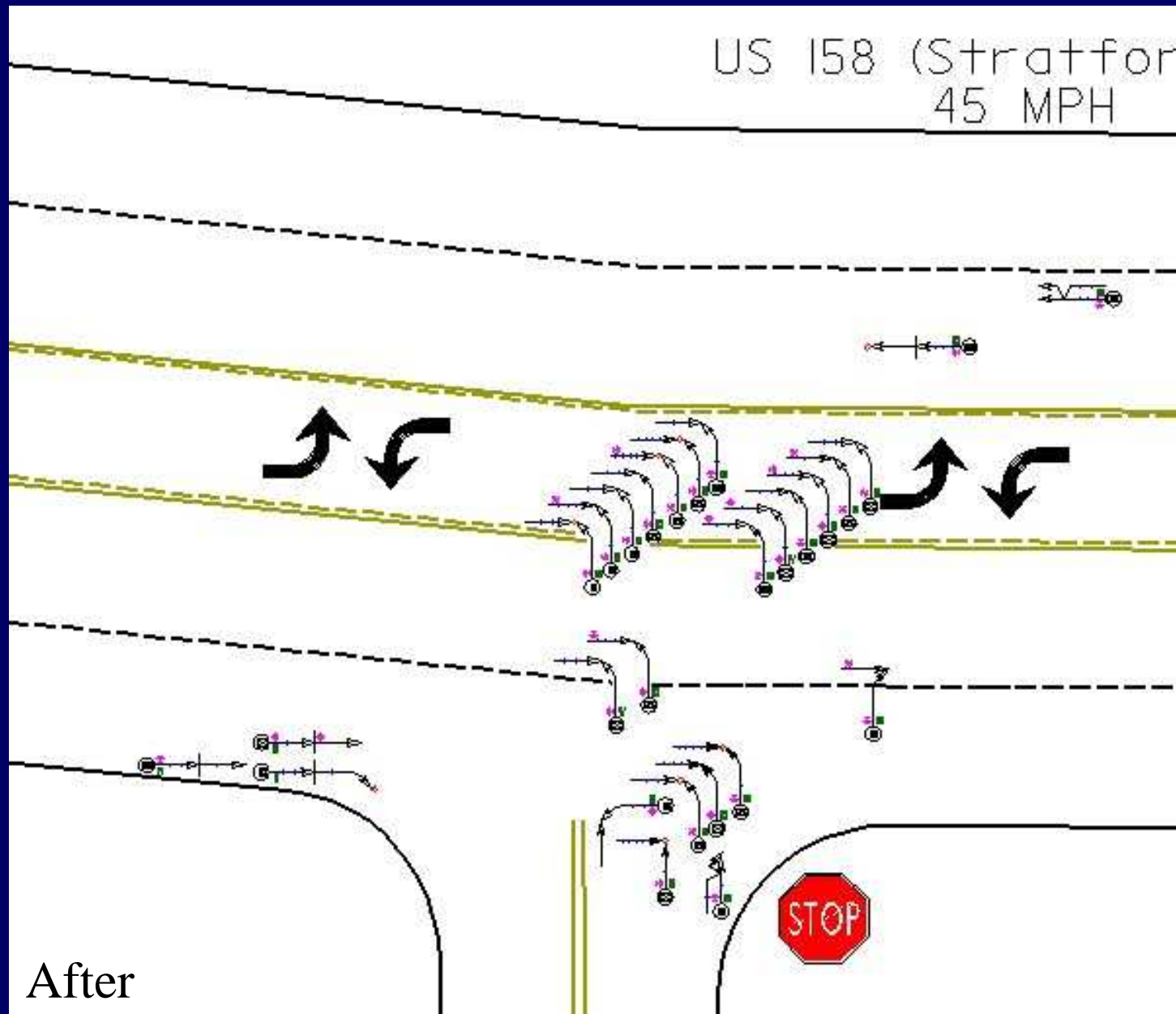
Directional Crossover - 7



Directional Crossover - 7



Directional Crossover - 7



Directional Crossover - 7

Results

<u>Frontis St Influence Information</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Total Crashes	5	29	480.0
Total Severity Index	4.0	3.0	-23.2
Frontal Impact Crashes	3	22	633.3
Frontal Severity Index	1.0	3.0	201.0
Volume	20850	27650	32.6
<u>Influence Injury Crashes</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal	0	0	N/A
Class A	0	0	N/A
Class B	0	2	N/A
Class C	2	6	200.0
Property Damage Only	3	21	600.0
<u>Influence Injury Crashes</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal	0	0	N/A
Class A	0	0	N/A
Class B	0	2	N/A
Class C	0	4	N/A
Property Damage Only	3	16	433.3

Directional Crossover - 7



Directional Crossover - 8

- Location:
 - US 64 and SR 1163 (Kelly Road) in Wake County || SS # 05-00-015
- Problem Statement:
 - Vehicles failing to yield to the right of way causing angle crashes
- Countermeasure:
 - Installation of a Directional Crossover
 - Cost: \$40,000
 - Project completion - December 2, 2002
 - 3 Years and 8 Months - Before and After Data

Directional Crossover - 8



Directional Crossover - 8

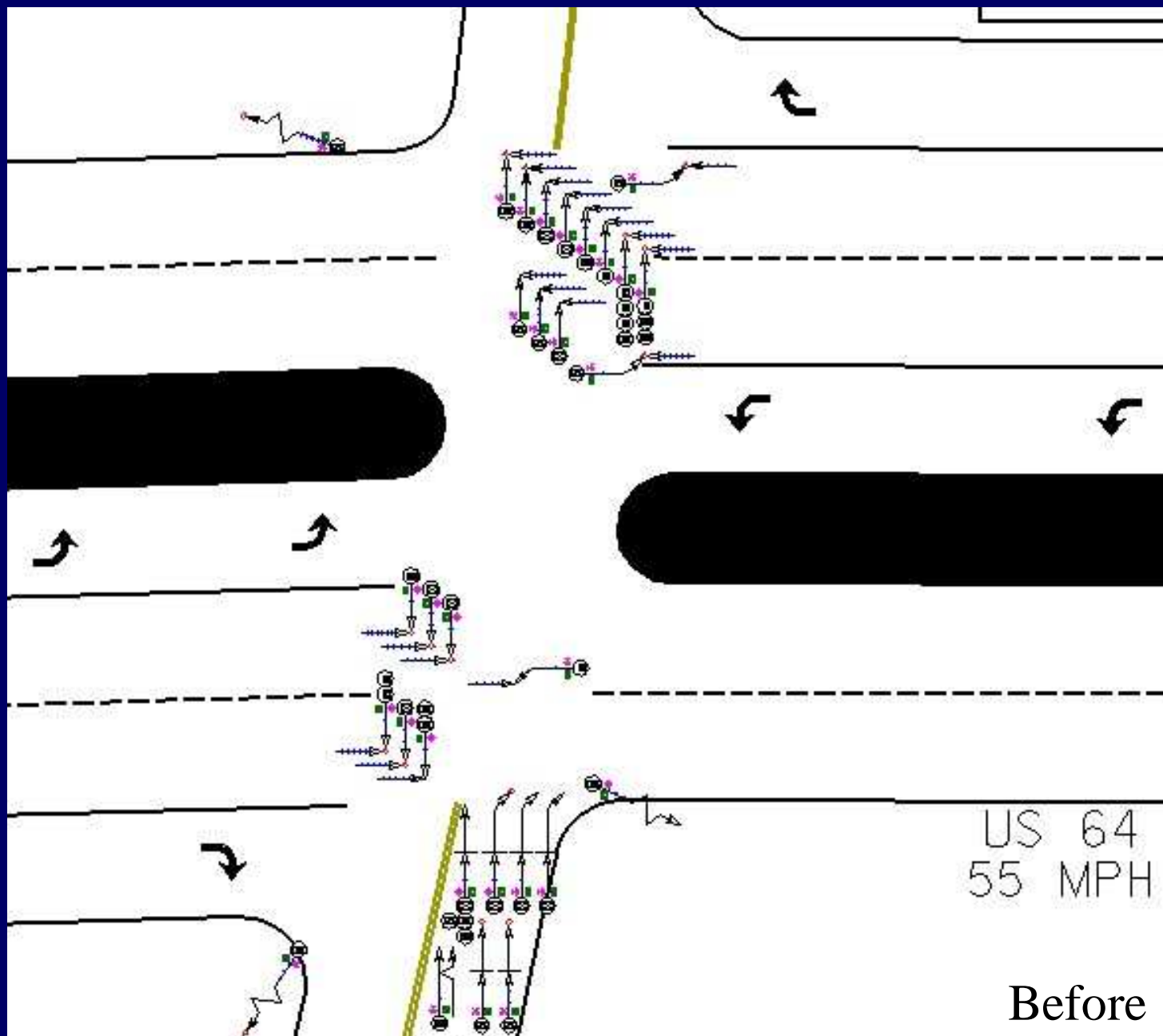
Looking West



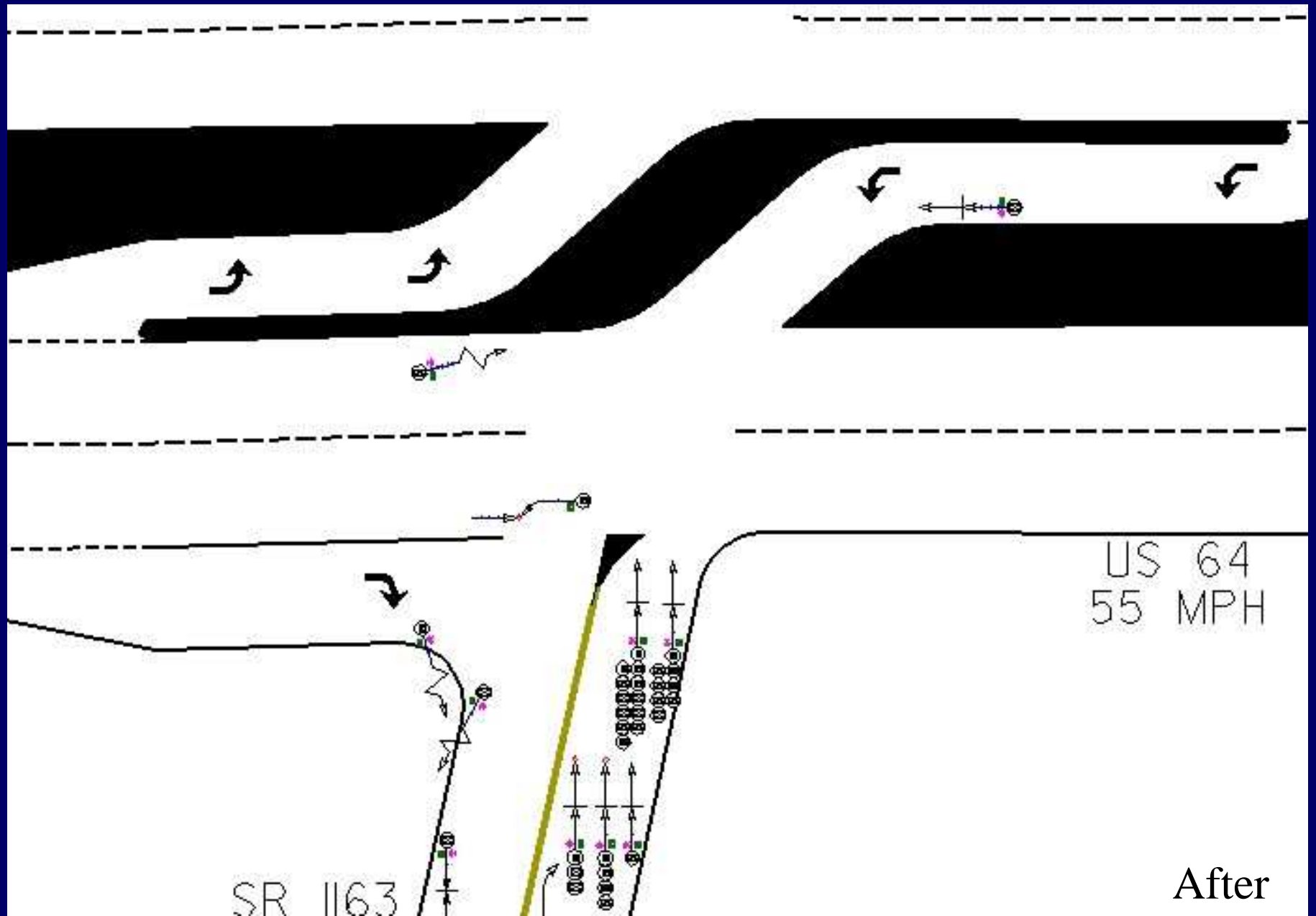
Looking East



Directional Crossover - 8



Directional Crossover - 8

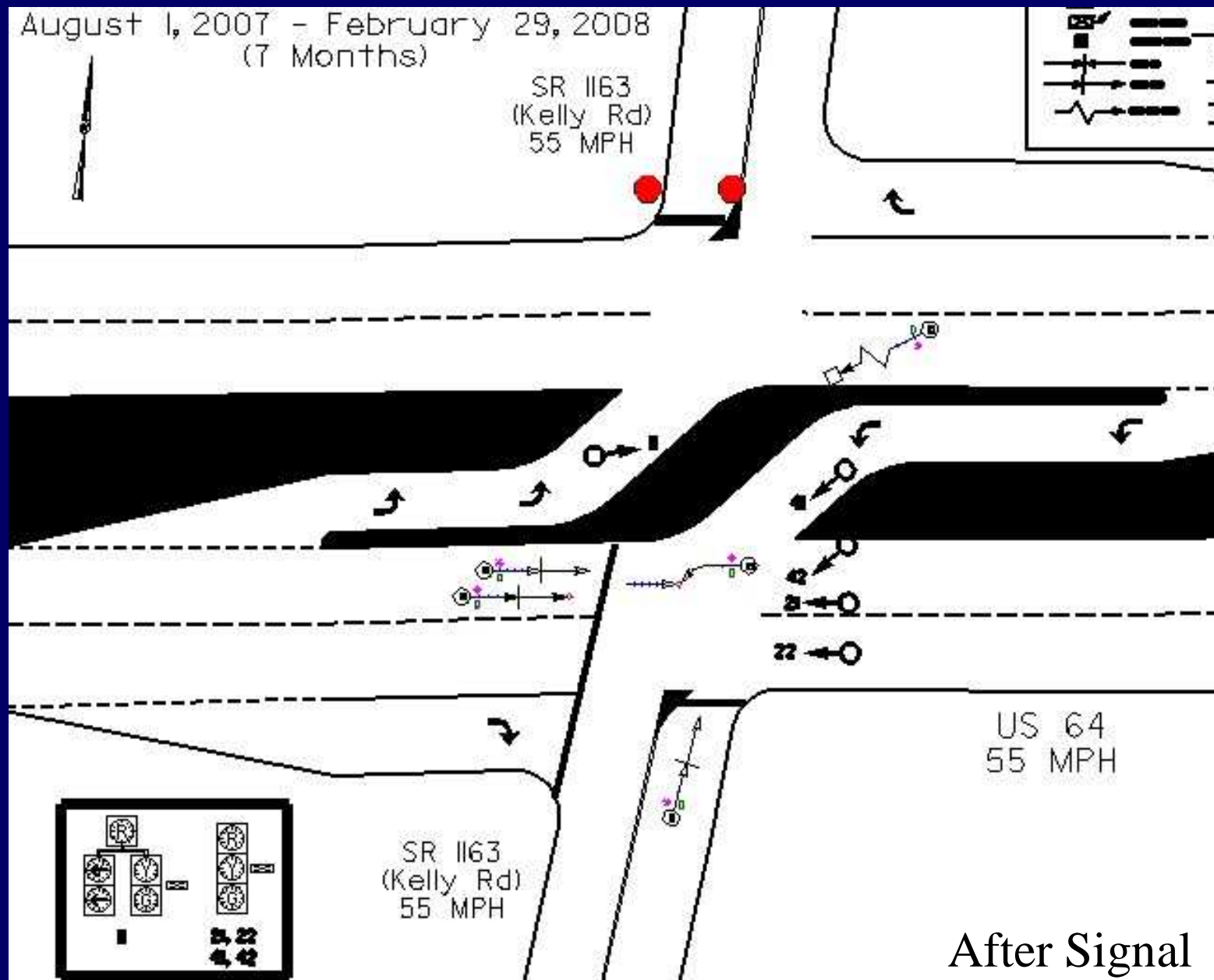


Directional Crossover - 8

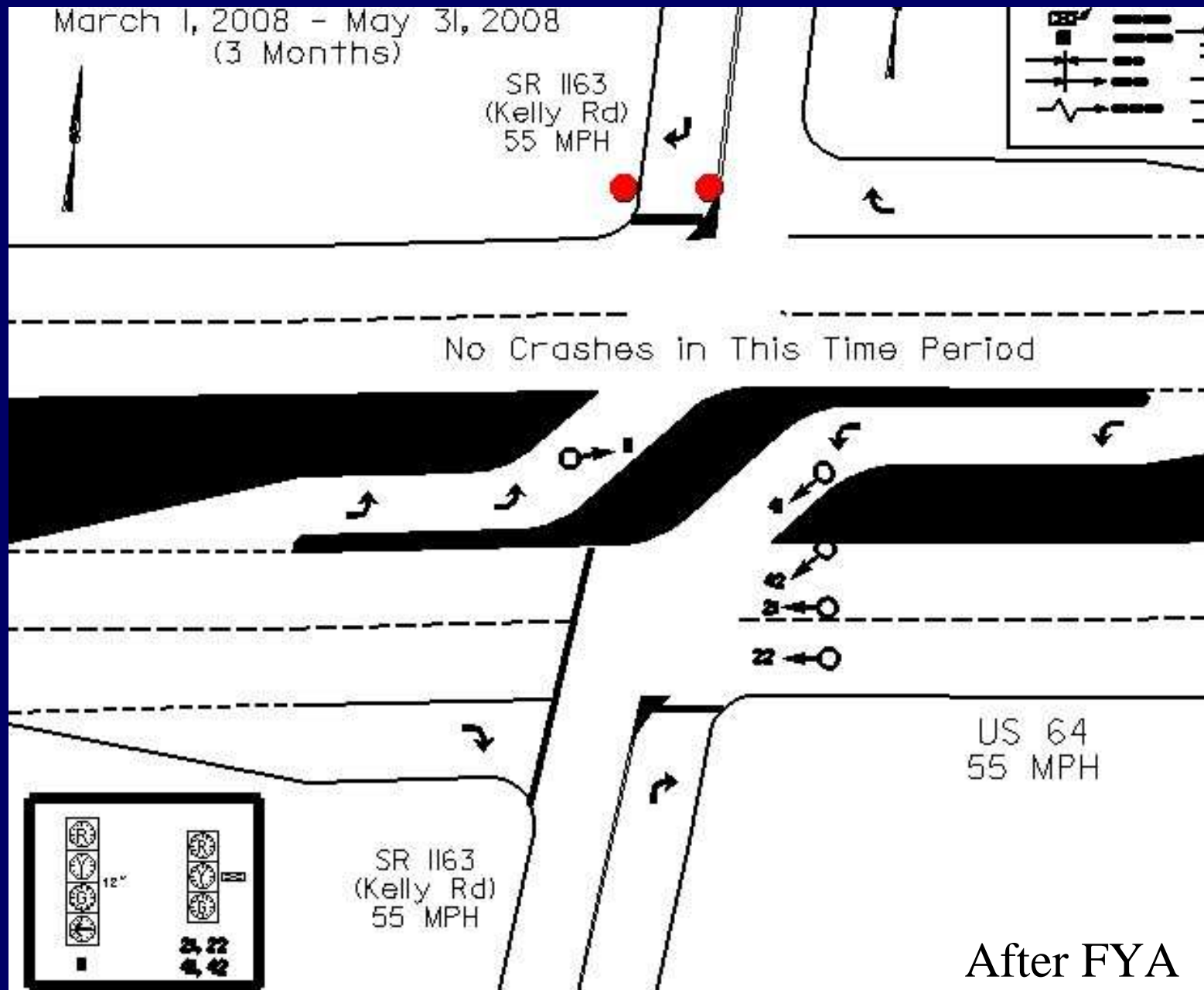
	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	43	35	-18.6
Total Severity Index	6.2	2.7	-56.6
Frontal Impact Crashes	28	1	-96.4
Frontal Severity Index	7.7	8.4	9.5
Volume	21590	28340	31.3

	Before	After	Percent Reduction (-) Percent Increase (+)
Rear-End Crashes	11	30	172.7
Severity Index	3.0	2.7	-9.7

Directional Crossover - 8



Directional Crossover - 8



Directional Crossover Summary

- Just reviewed 8 of the 16 Directional Crossover Projects we have evaluated from the Spot Safety Program

Crossover

- SS 02-00-208 / SS 02-00-209 Craven - Four locations on US 70 near Havelock
- SS 02-94-216 Pitt - US 264 (Greenville) at SR 1523 (Whichard)
- SS 03-96-400 Onslow - Us 17 at Parkwood / Western Shopping Plaza
- SS 03-97-005 New Hanover - NC 132 at SR 2003 (King's Grant)
- SS 04-96-017 Nash - US 301 (Wesleyan), 0.1 North of SR 1604 (Hunter Hill)
- NEW!** SS 05-00-015 Wake - US 64 at SR 1163 (Kelly)
- SS 05-99-243 Wake - US 64 at SR 2234 / SR 2500 (Mark's Creek)
- SS 06-95-201 Cumberland - US 401 (Raeford) at SR 1546 (Little) / Falcon Village Shopping Center
- SS 09-98-219 Forsyth - US 158 at Burke Mill
- SS 09-99-202 Forsyth - NC 67 (Silas Creek) at Forsyth Technical College Driveway
- SS 09-99-218 Forsyth - SR 4315 (Main) at Century
- NEW!** SS 09-99-228 Davidson - I-85 Business / US 29 / 70 at SR 1774 (Mendenhall)
- NEW!** SS 10-02-200 Union - Three Crossover Locations on SR 1223 (Dickerson) from US 74 to Commerce
- SS 11-99-210 Caldwell - US 321 (Hickory) at SR 1796 (Victoria / Clover)
- SS 14-97-017 Jackson - US 23-74 at SR 1527 (Steeple) and SR 1449 (Cope Creek)
- SS 14-97-018 Haywood - US 23-74 from Jackson County Line to East of SR 1158

<http://www.ncdot.org/doh/preconstruct/traffic/safety/ses/projects/completed.html>

Traffic Signal Revision - 1

- Location:
 - US 70 and SR 1242 (Perkins Mill Road) in Wayne County || SS # 04-01-214
- Problem Statement:
 - Left turning vehicles on Westbound US 70 were stopped in through lanes due to congestion
 - The same left turning vehicles were having difficulty seeing past large trucks turning left into distribution center
- Countermeasure:
 - Extend left turn storage, change phasing to Protected Only
 - Cost: \$100,000
 - Project completion - May 14, 2002
 - 4 Years and 4 Months - Before and After Data

Traffic Signal Revision - 1



Traffic Signal Revision - 1

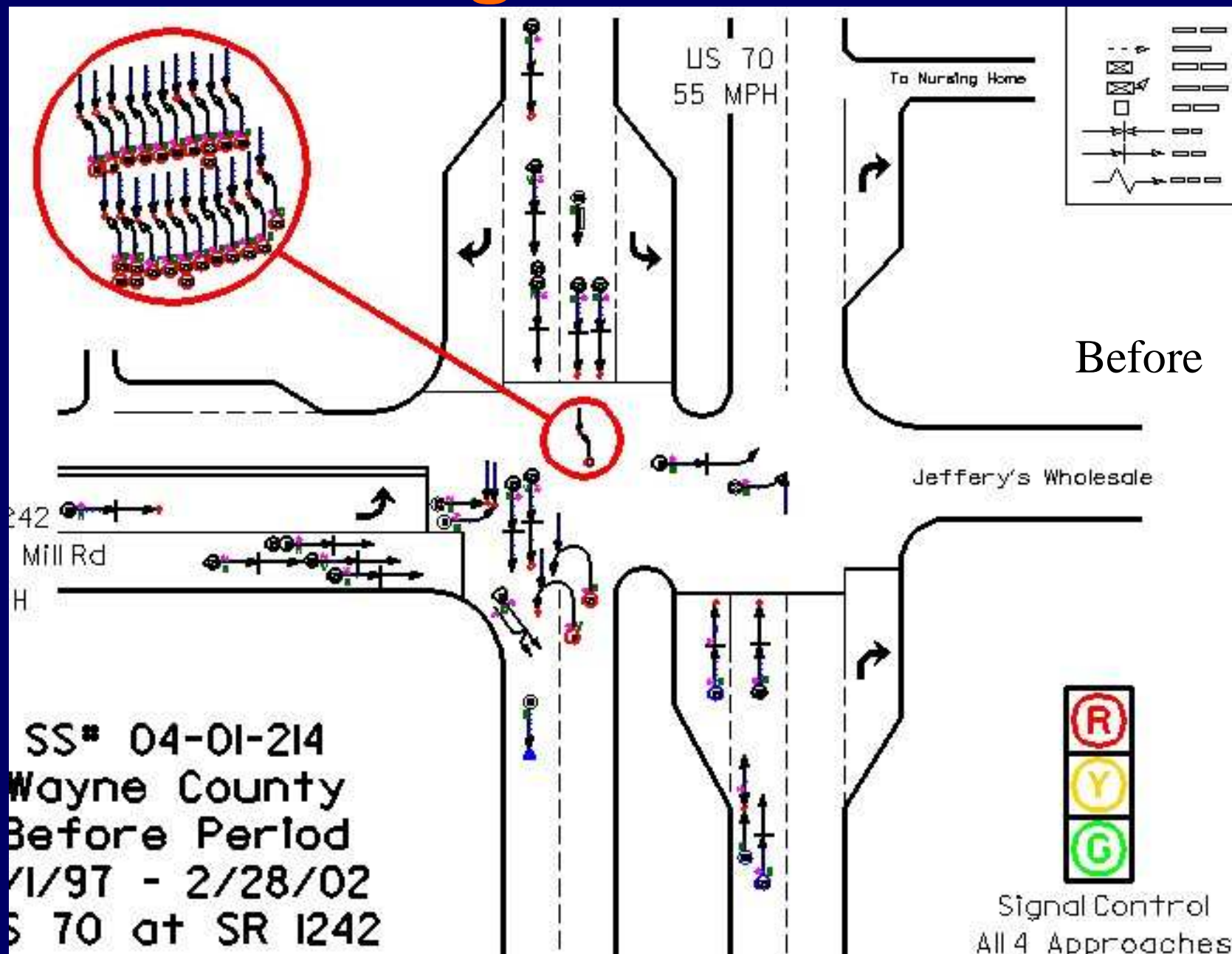
Looking West



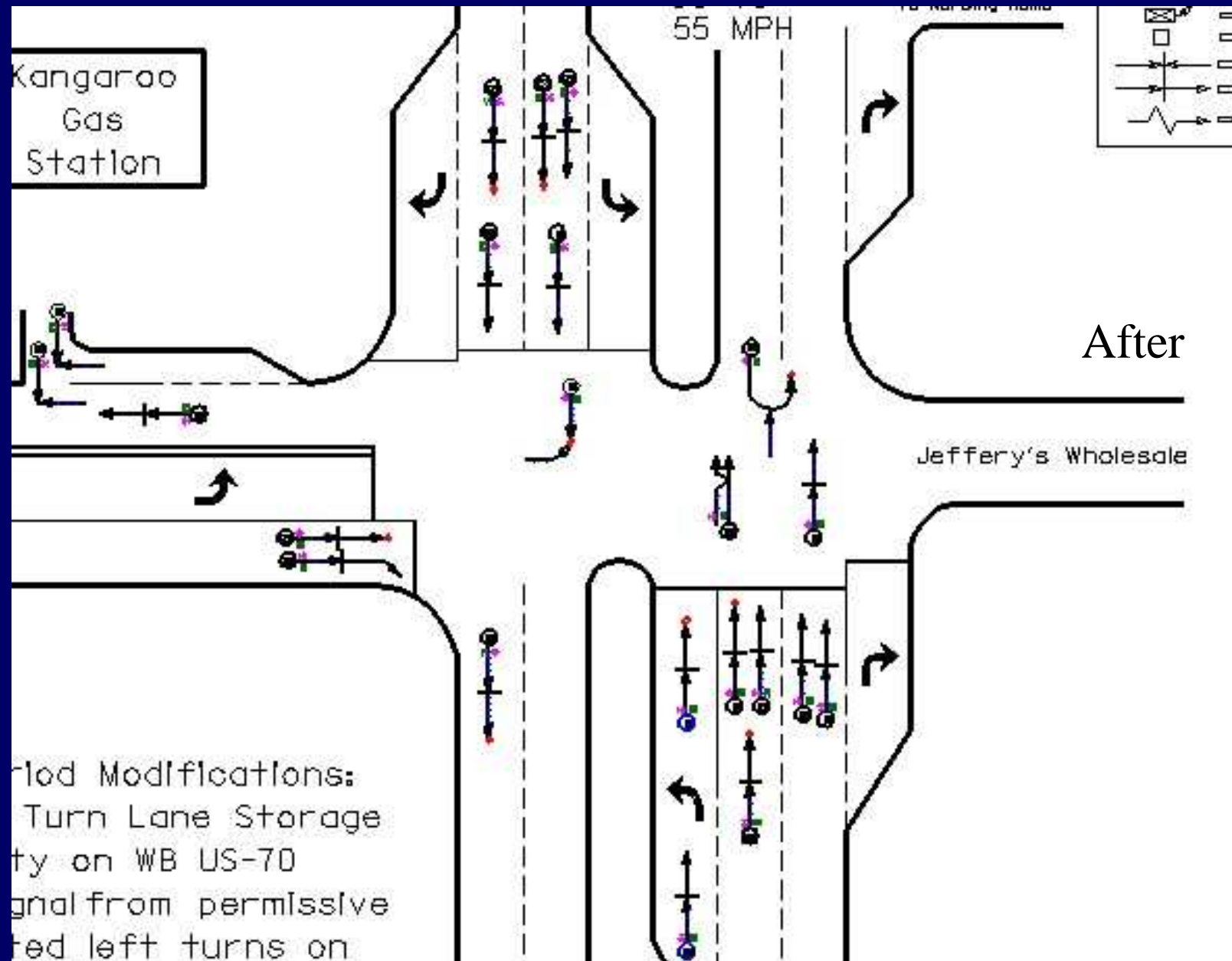
Looking West



Traffic Signal Revision - 1



Traffic Signal Revision - 1



Traffic Signal Revision - 1

	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	52	23	- 55.77 %
Total Severity Index	9.22	3.90	- 57.70 %
Target Crashes I (Left Turn)	27	0	- 100.00 %
Target Crash I Severity Index	11.20	0.00	- 100.00 %
Target Crash II (Rear-ends)	3	3	0.00 %
Target Crash II Severity Index	5.93	3.47	- 41.48 %
Volume	31,500	33,500	6.35 %

Traffic Signal Revision - 2

- Location:
 - SR 1950 (Academy Street) and SR 1952 (High Point Street) in Randolph County || SS # 08-02-202
- Problem Statement:
 - Left turn accident problem existed with motorists attempting to turn left onto SR 1952
- Countermeasure:
 - Change phasing to Protected Only for both directions
 - Cost: \$5,000
 - Project completion - April 23, 2002
 - 4 Years and 6 Months - Before and After Data

Traffic Signal Revision - 2



Traffic Signal Revision - 2

Looking North

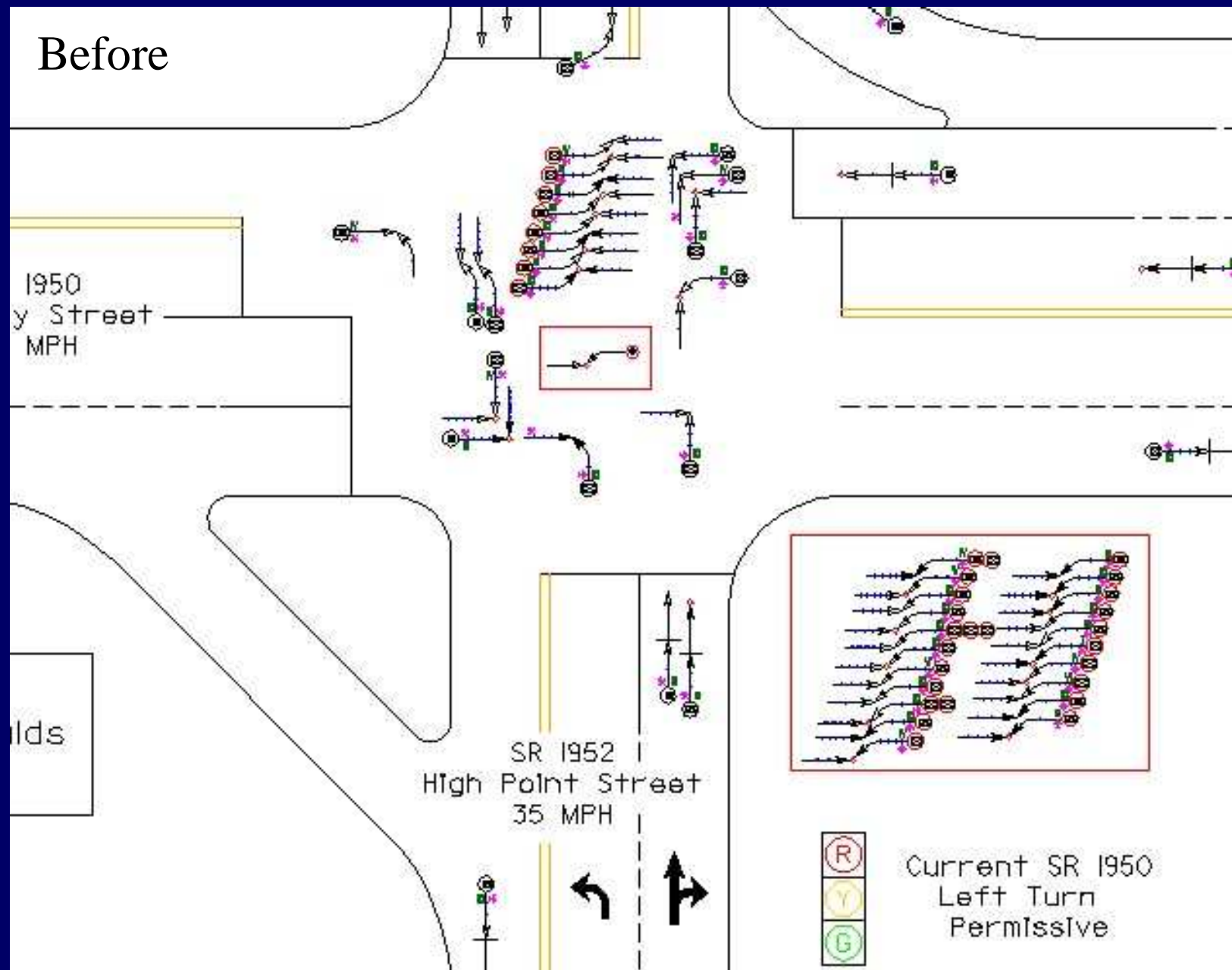


Looking South



Traffic Signal Revision - 2

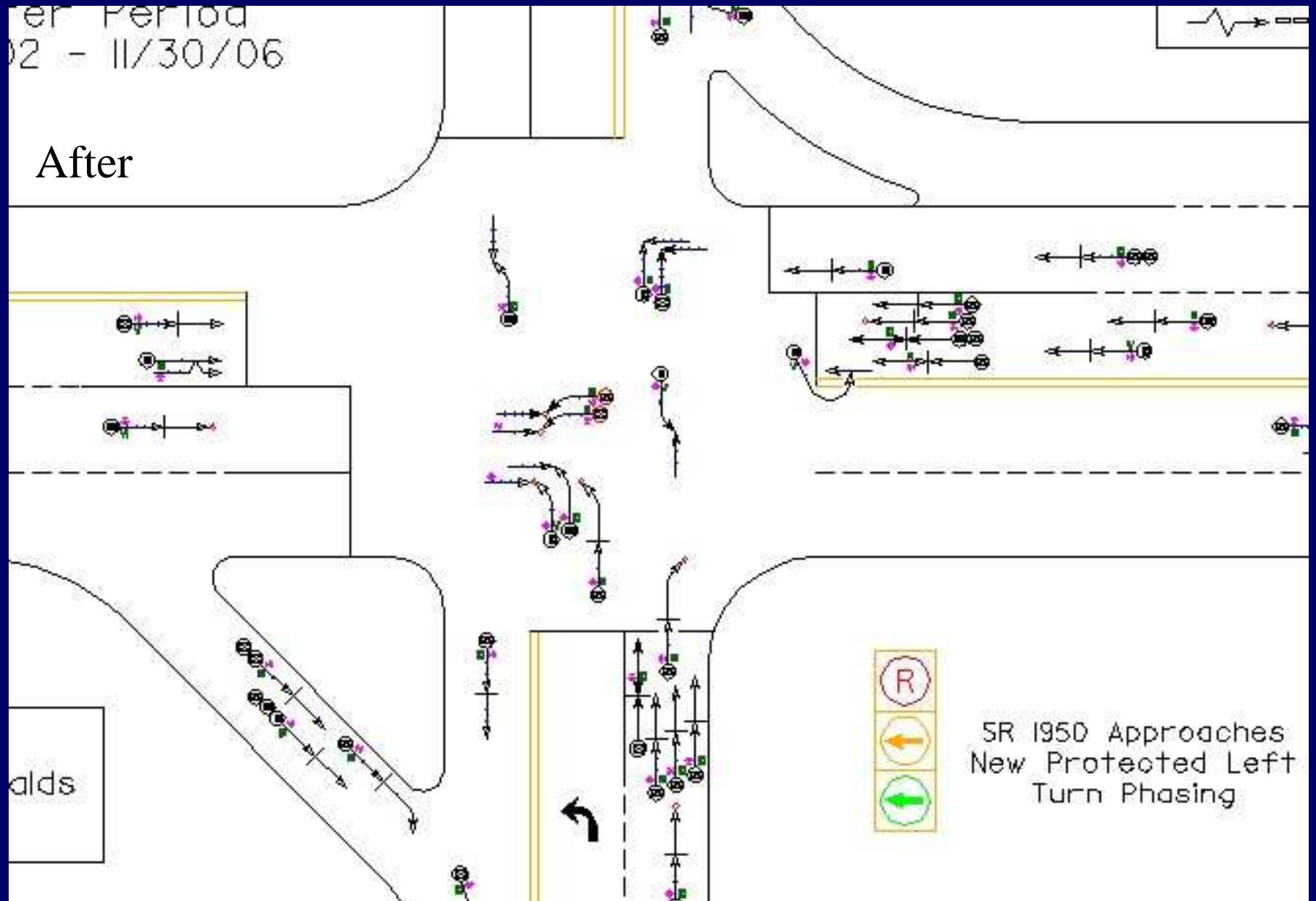
Before



Traffic Signal Revision - 2

er Period
02 - 11/30/06

After



Traffic Signal Revision - 2

	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	56	47	- 16.07 %
Total Severity Index	12.85	4.19	- 67.39 %
Target Crashes	33	2	- 93.94 %
Target Crash Severity Index	14.73	8.4	- 42.97 %
Volume	12,300	14,100	14.63 %

Traffic Signal Revision - 3

- Location:
 - NC 18 (Grover Street) at Washington Street and SR 1861 (Lafayette Street) in Cleveland County || SS # 12-99-216 and 12-01-213
- Problem Statement:
 - Left turning vehicles on NC 18 causing crash patterns
- Countermeasure:
 - Signal coordination, restripe cross section, change left turn phasing to Protected Only
 - Cost: \$20,000 and \$35,000
 - Project completion - April 30, 2001 and January 16, 2002
 - 5 Years and 2 Months - Before and After Data

Traffic Signal Revision - 3



Traffic Signal Revision - 3

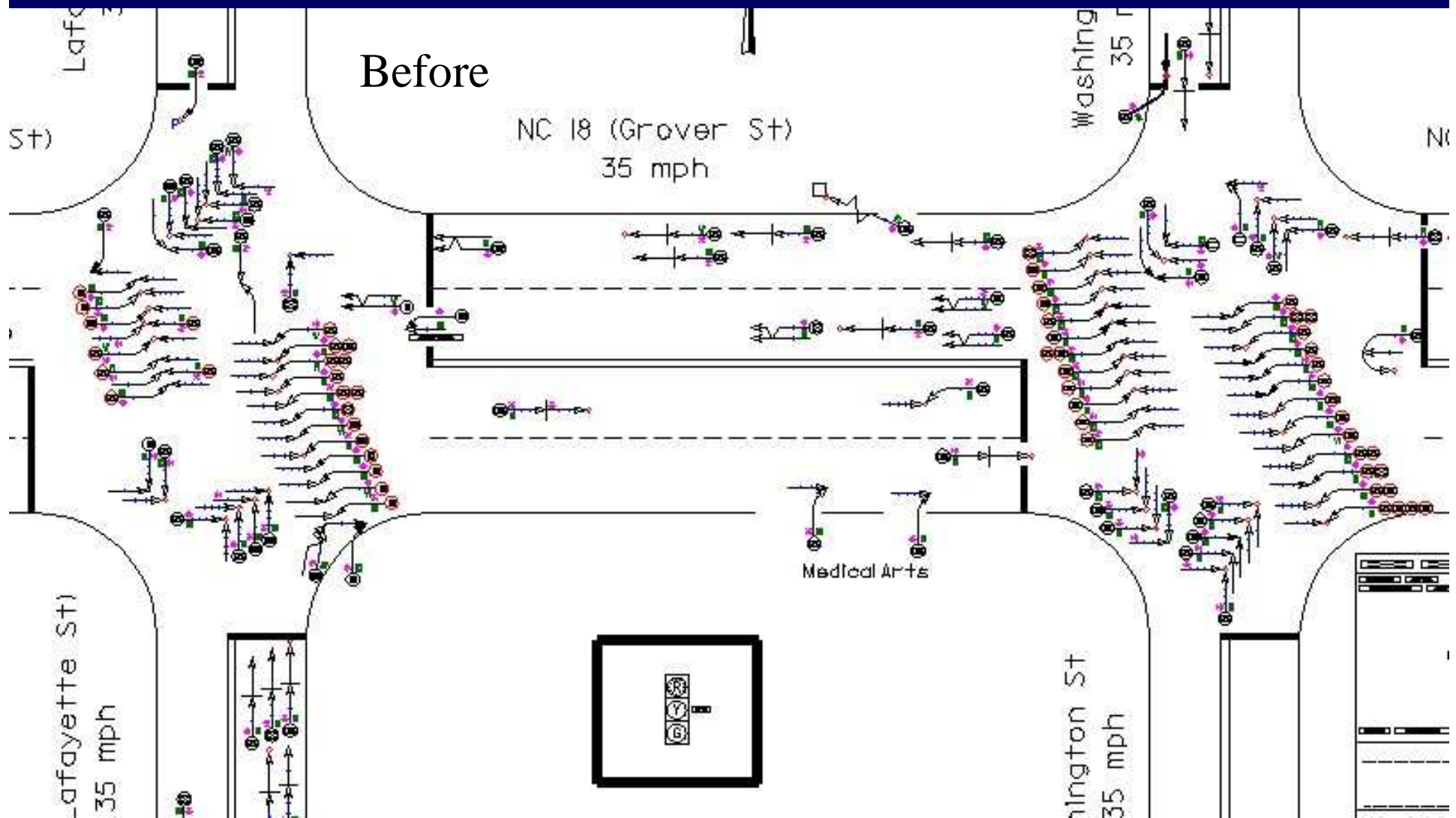
Looking West



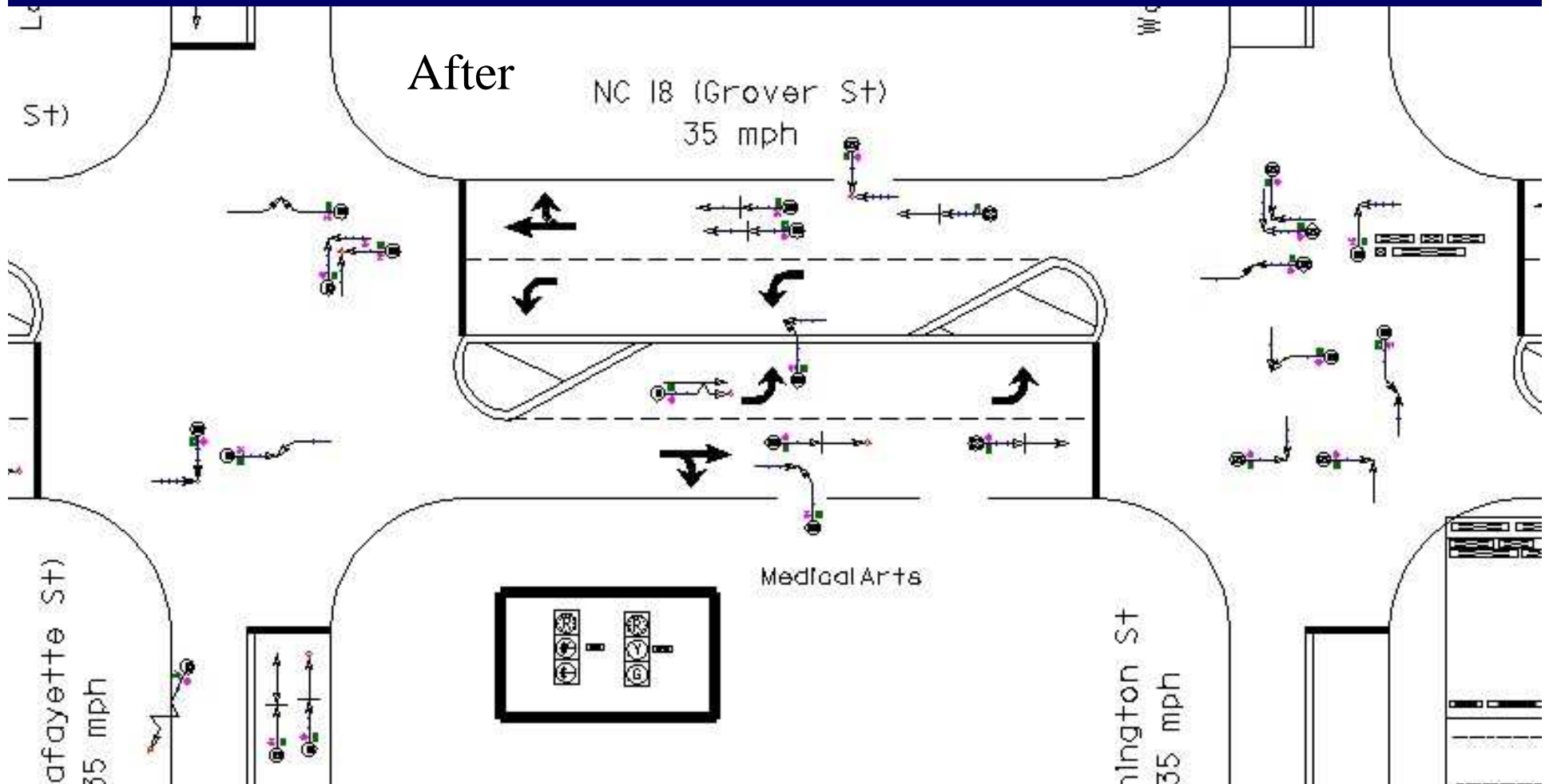
Looking East



Traffic Signal Revision - 3



Traffic Signal Revision - 3



Traffic Signal Revision - 3

	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	126	35	-72.2
Total Severity Index	7.78	2.90	-62.7
Total Target Crashes	56	3	-94.6
Total Target Crash Severity Index	5.92	1	-83.1
Target Crashes at Washington	33	1	-97.0
Target Crash Severity Index at Washington	5.04	1	-80.2
Target Crashes at Lafayette	23	2	-91.3
Target Crash Severity Index at Lafayette	7.19	1	-86.1
Volume	13,000	13,000	0.0

Traffic Signal Revision - 4

- Location:
 - SR 1401 (16th Street NE) and SR 1402/SR 1404 (29th Avenue NE) in Catawba County || SS # 12-01-203
- Problem Statement:
 - Excessive delay on the three approaches
 - Relieve delay during peak hour traffic flows
- Countermeasure:
 - Change phasing to Protected-Permitted on the NB, WB, and EB approaches
 - Cost: \$20,000
 - Project completion - April 29, 2002
 - 4 Years and 7 Months - Before and After Data

Traffic Signal Revision - 4



Traffic Signal Revision - 4

Looking East

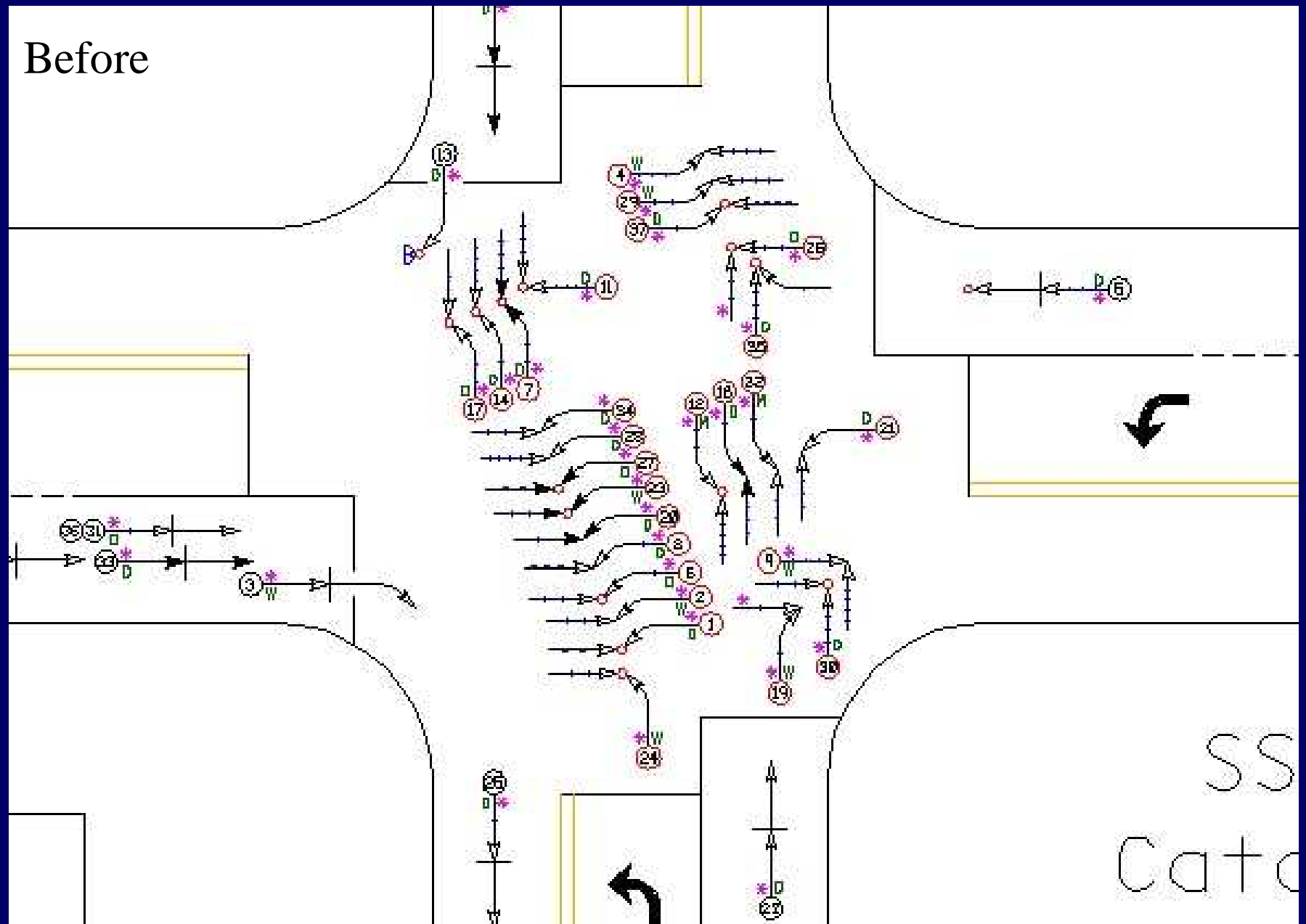


Looking West



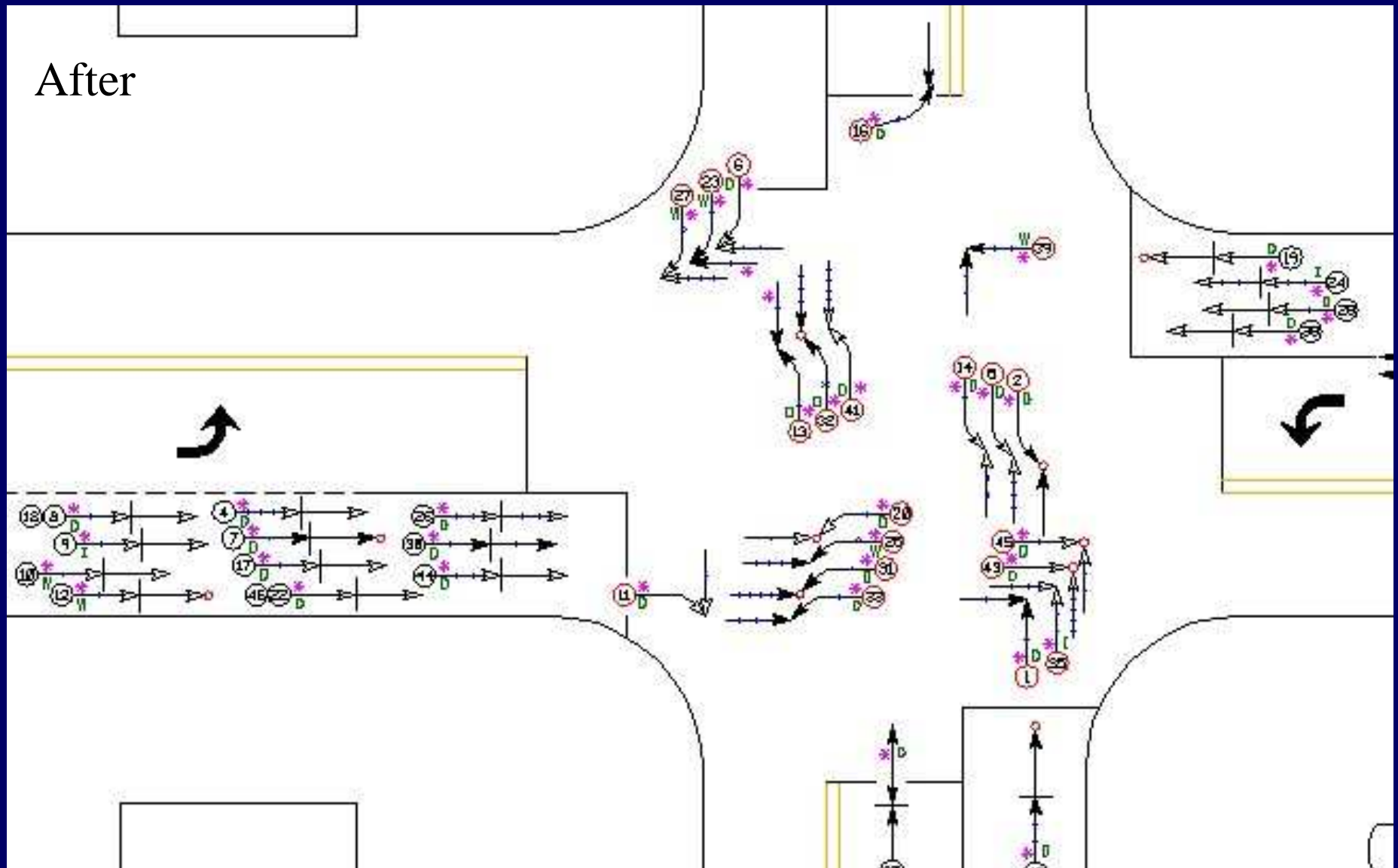
Traffic Signal Revision - 4

Before



Traffic Signal Revision - 4

After



Traffic Signal Revision - 4

	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	37	46	24.32 %
Total Severity Index	6.45	2.93	- 54.57 %
Target Crashes	26	21	- 19.23 %
Target Crash Severity Index	7.62	3.11	- 59.19 %
Volume	19,550	24,000	22.76 %

Traffic Signal Revision - 5

- Location:
 - US 401 (Raeford Road) and SR 1411 (Bunce Road) in Cumberland County || SS # 06-02-214
- Problem Statement:
 - An accident problem exists for motorists attempting to turn left onto SR 1411 due to the high volume of traffic and insufficient gaps
- Countermeasure:
 - Change phasing to Protected-Permitted on the EB approach
 - Cost: \$30,000
 - Project completion - October 15, 2002
 - 4 Years - Before and After Data

Traffic Signal Revision - 5



Traffic Signal Revision - 5

Looking East



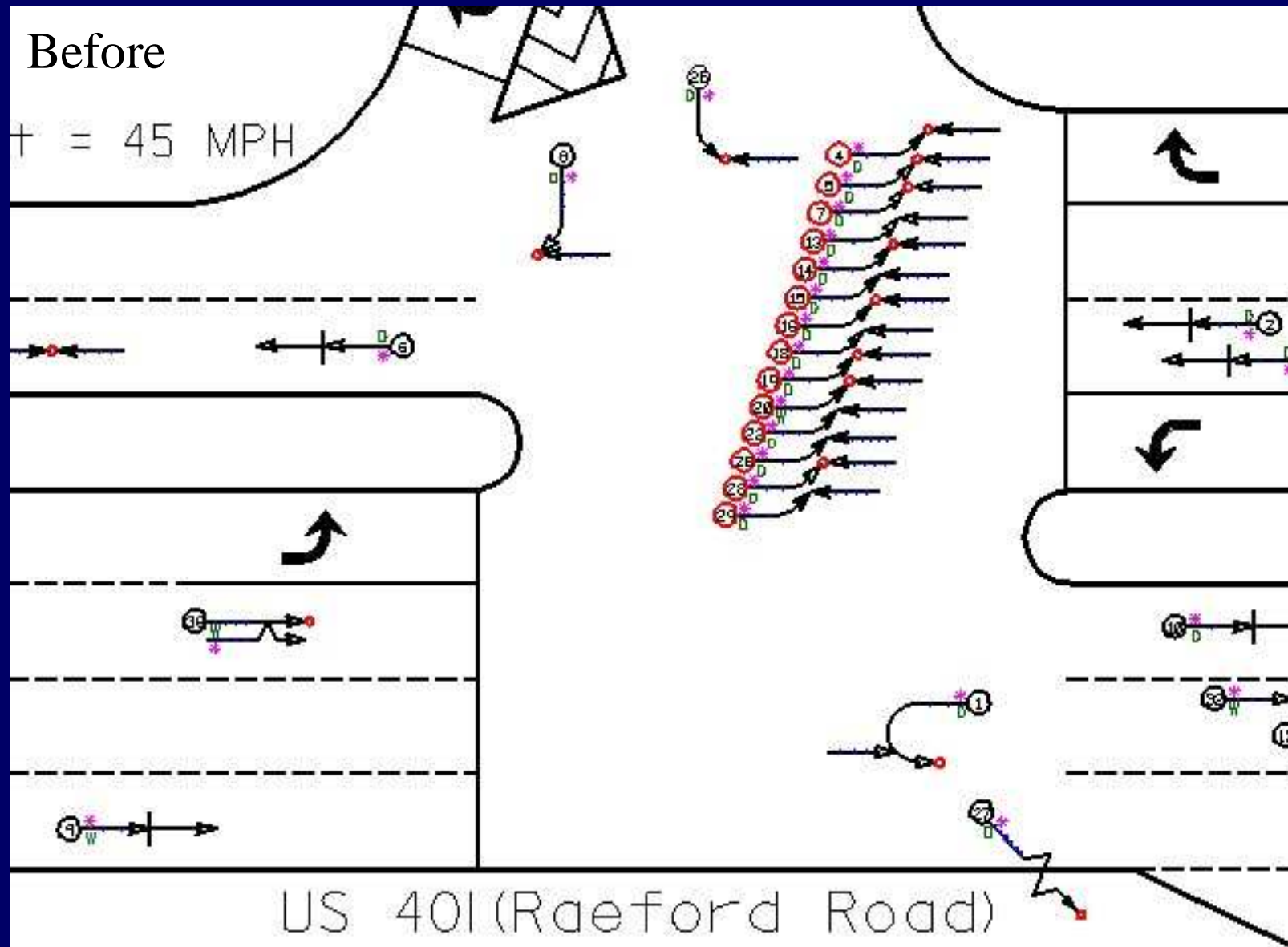
Looking West



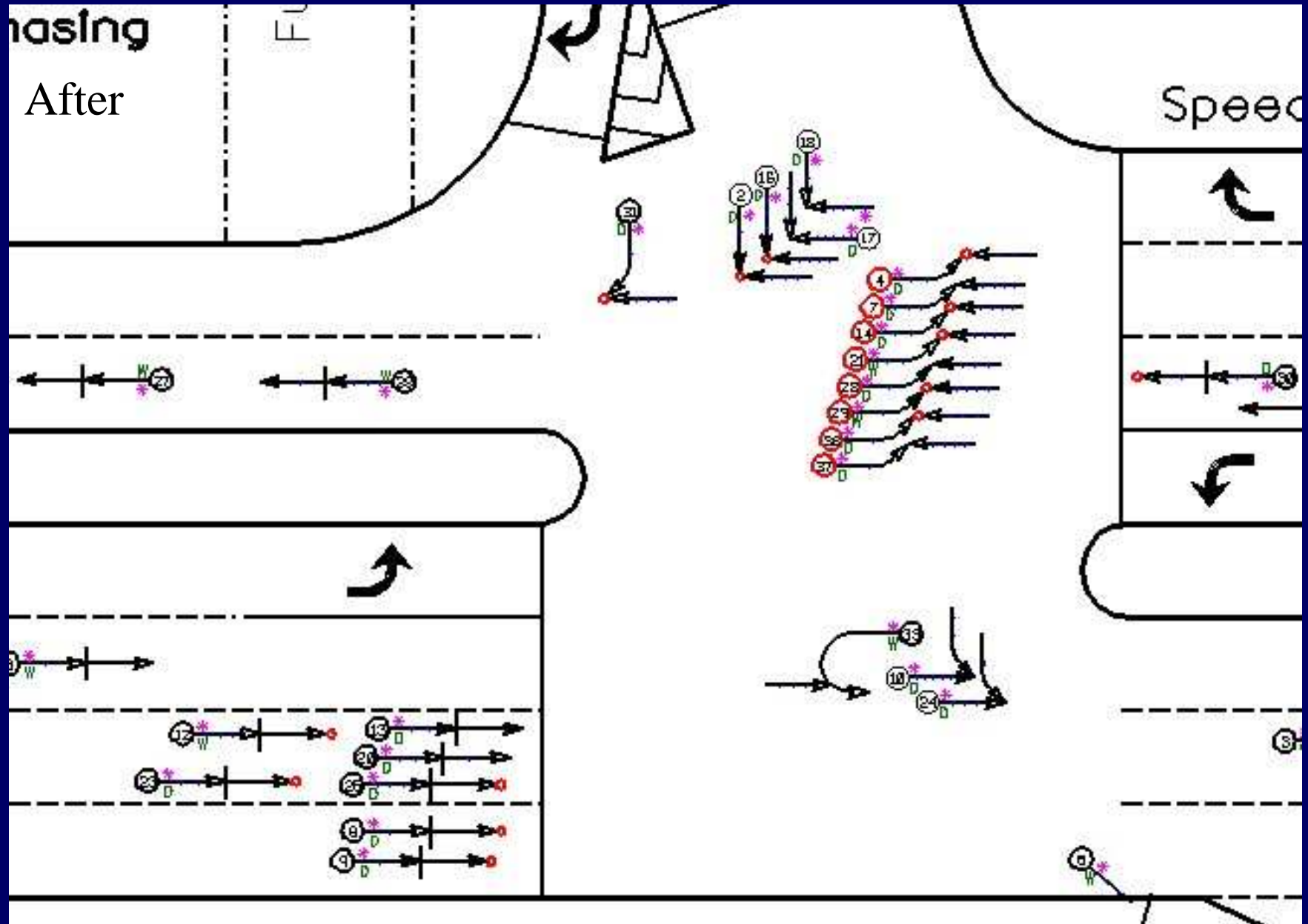
Traffic Signal Revision - 5

Before

45 MPH



Traffic Signal Revision - 5



Traffic Signal Revision - 5

	Before	After	Percent Reduction (-) Percent Increase (+)
Total Crashes	36	39	8.33
Total Severity Index	6.60	4.42	- 33.03
Target Crashes	14	8	- 42.86
Target Severity Index	5.23	5.63	7.65
Volume	38,700	45,800	18.35

Traffic Signal Revision - 6

- Location:
 - SR 1349 (Dillard Drive) and SR 1319 (Jones Franklin Road) in Wake County || SS # 05-00-217
- Problem Statement:
 - Traffic would queue up at the intersection to turn left, and drivers would use the exclusive right turn lane to illegally pass
- Countermeasure:
 - Add left turn lane, change phasing to Protected-Permitted on the EB and SB approaches
 - Cost: \$57,000
 - Project completion - April 11, 2002
 - 4 Years and 11 Months - Before and After Data

Traffic Signal Revision - 6



Traffic Signal Revision - 6

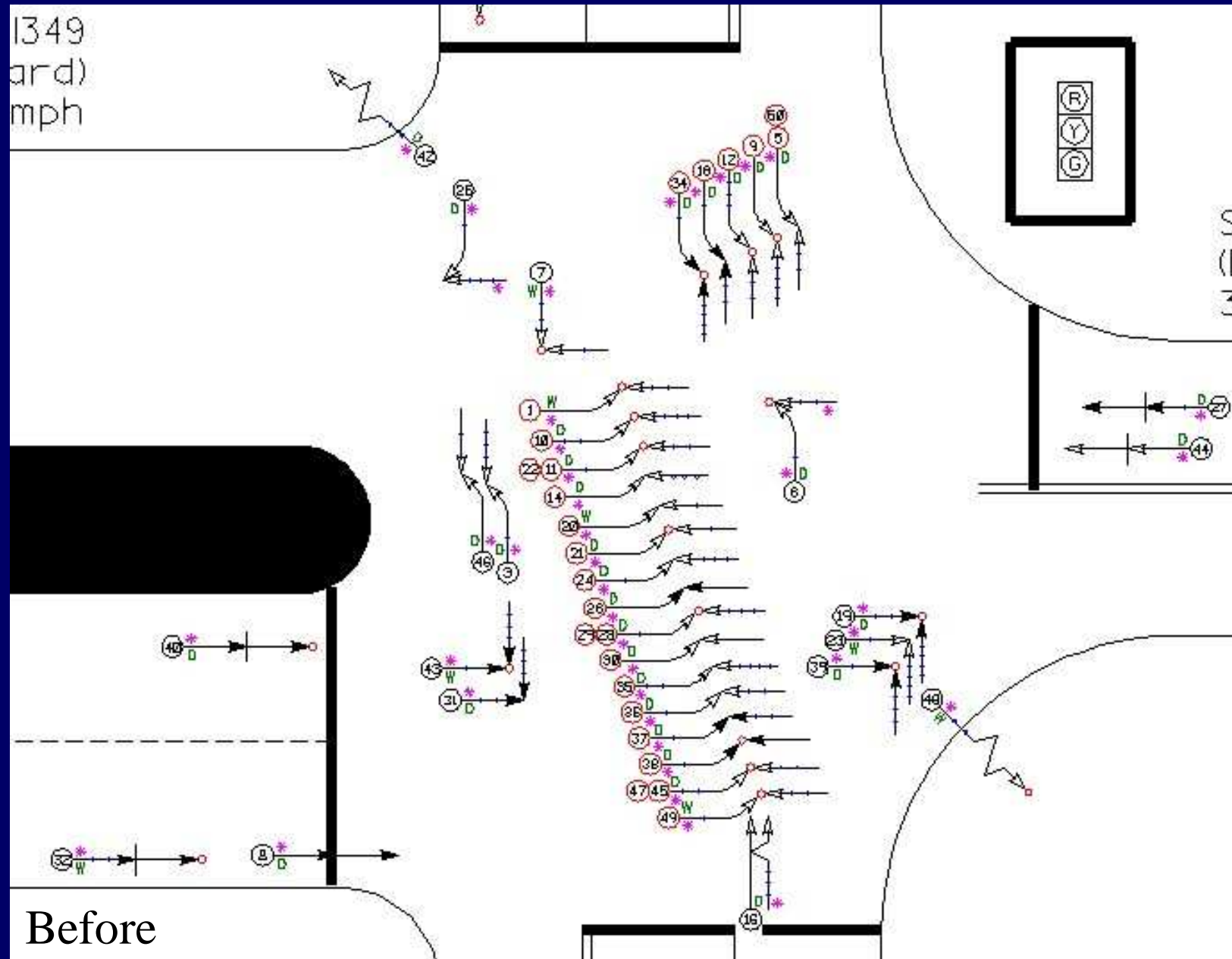
Looking East



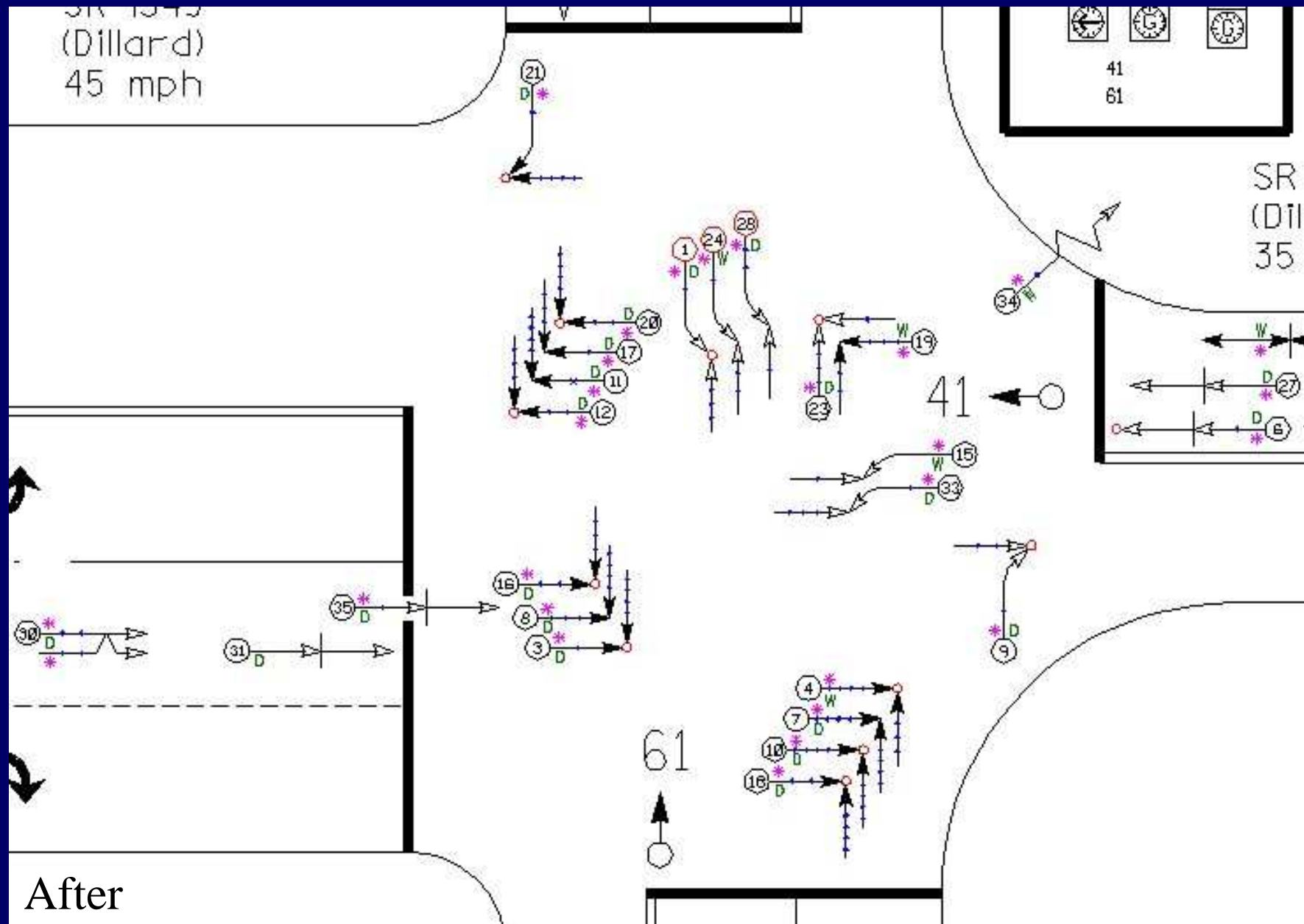
Looking South



Traffic Signal Revision - 6



Traffic Signal Revision - 6



Traffic Signal Revision - 6

	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	50	35	-30.0
Total Severity Index	4.4	3.54	-19.5
EB Left Turn-Same Roadway	19	0	-100.0
EB Left Turn-Same Crash Severity Index	5.28	0	-100.0
SB Left Turn-Same Roadway	6	3	-50.0
SB Left Turn-Same Crash Severity Index	4.7	3.47	-26.2
Volume	19,400	24,500	26.3

Traffic Signal Install - 1

- Location:
 - US 21/NC 115 (Charlotte Highway) and I 77 Northbound Ramp in Iredell County || SS # 12-01-234
- Problem Statement:
 - Significant angle and left turn crash pattern at the ramp
 - Queuing on the off ramp backing traffic onto I 77
- Countermeasure:
 - Install traffic signal
 - Cost: \$75,000
 - Project completion - October 8, 2002
 - 4 Years and 9 Months - Before and After Data

Traffic Signal Install - 1



Traffic Signal Install - 1

Looking North

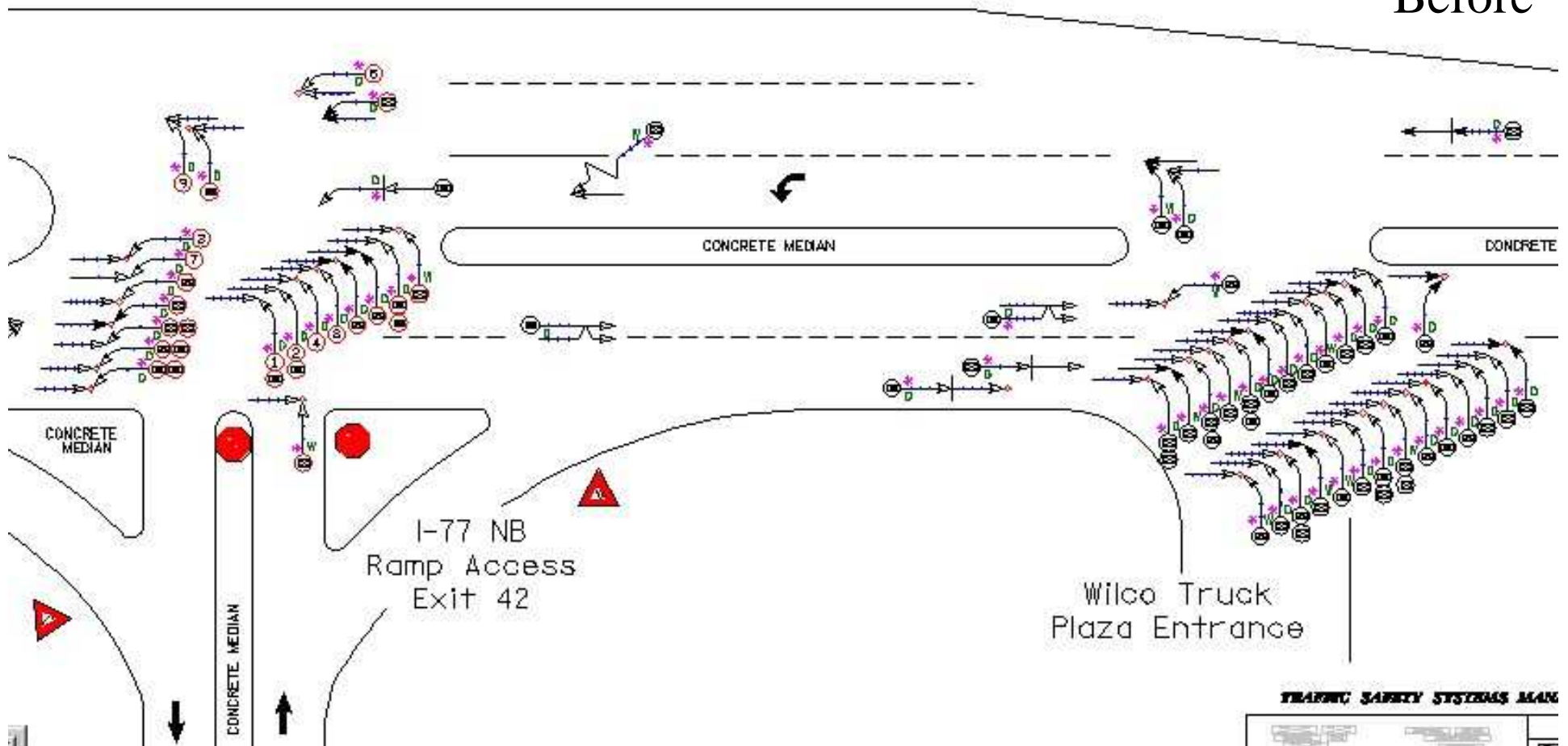


Looking East



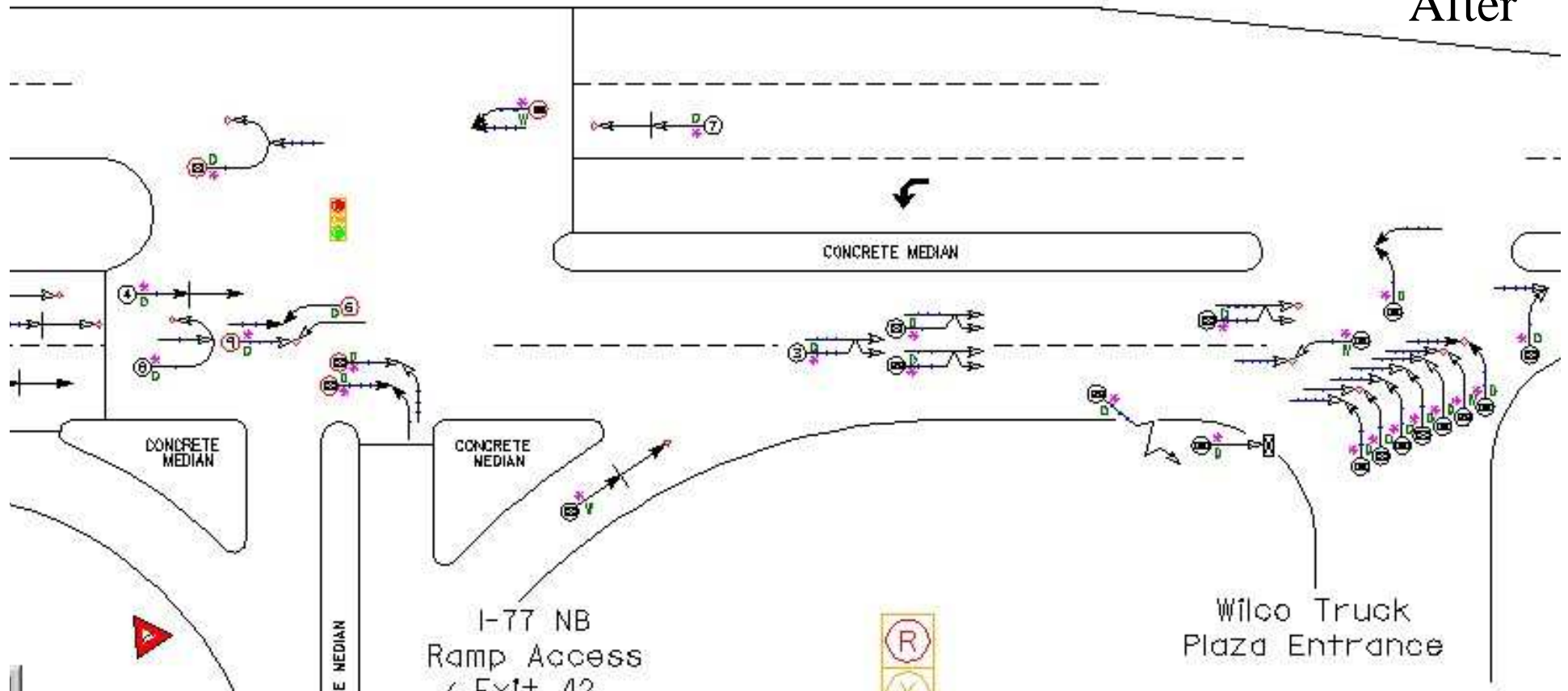
Traffic Signal Install - 1

Before



Traffic Signal Install - 1

After



Traffic Signal Install - 1

Table 1: Treatment Information – Countermeasure Signal at Ramps

	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	32	20	- 37.50 %
Total Severity Index	6.61	4.70	- 28.90 %
Target Crashes	27	6	- 66.67 %
Target Crash Severity Index	7.37	3.47	- 52.92 %
Volume	11,000	13,600	23.64 %

Table 2: Wilco Plaza Entrance – Median Opening

	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	41	14	- 65.85 %
Total Severity Index	8.85	3.64	- 58.87 %

Traffic Signal Install - 2

- Location:
 - US 401 Business (Ramsey Street) and Rosehill Road in Cumberland County || SS # 06-99-211
- Problem Statement:
 - High left and right turning volumes were creating long queues and therefore motorists, resulting in large crash patterns
- Countermeasure:
 - Install traffic signal, lane reassignment, and roadway realignment
 - Cost: \$110,000
 - Project completion - September 2, 2002
 - 4 Years - Before and After Data

Traffic Signal Install - 2



Traffic Signal Install - 2

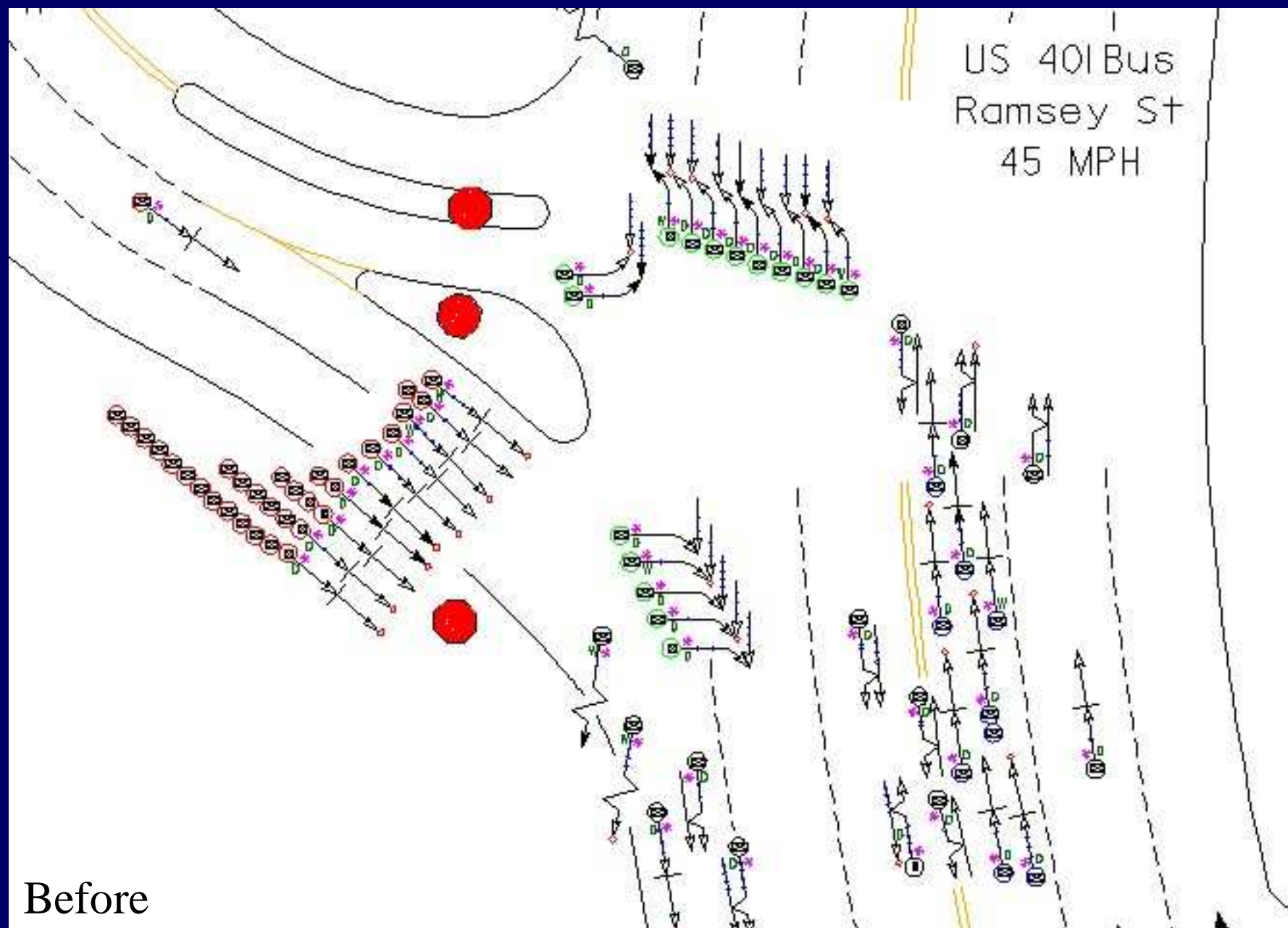
Looking North



Looking East

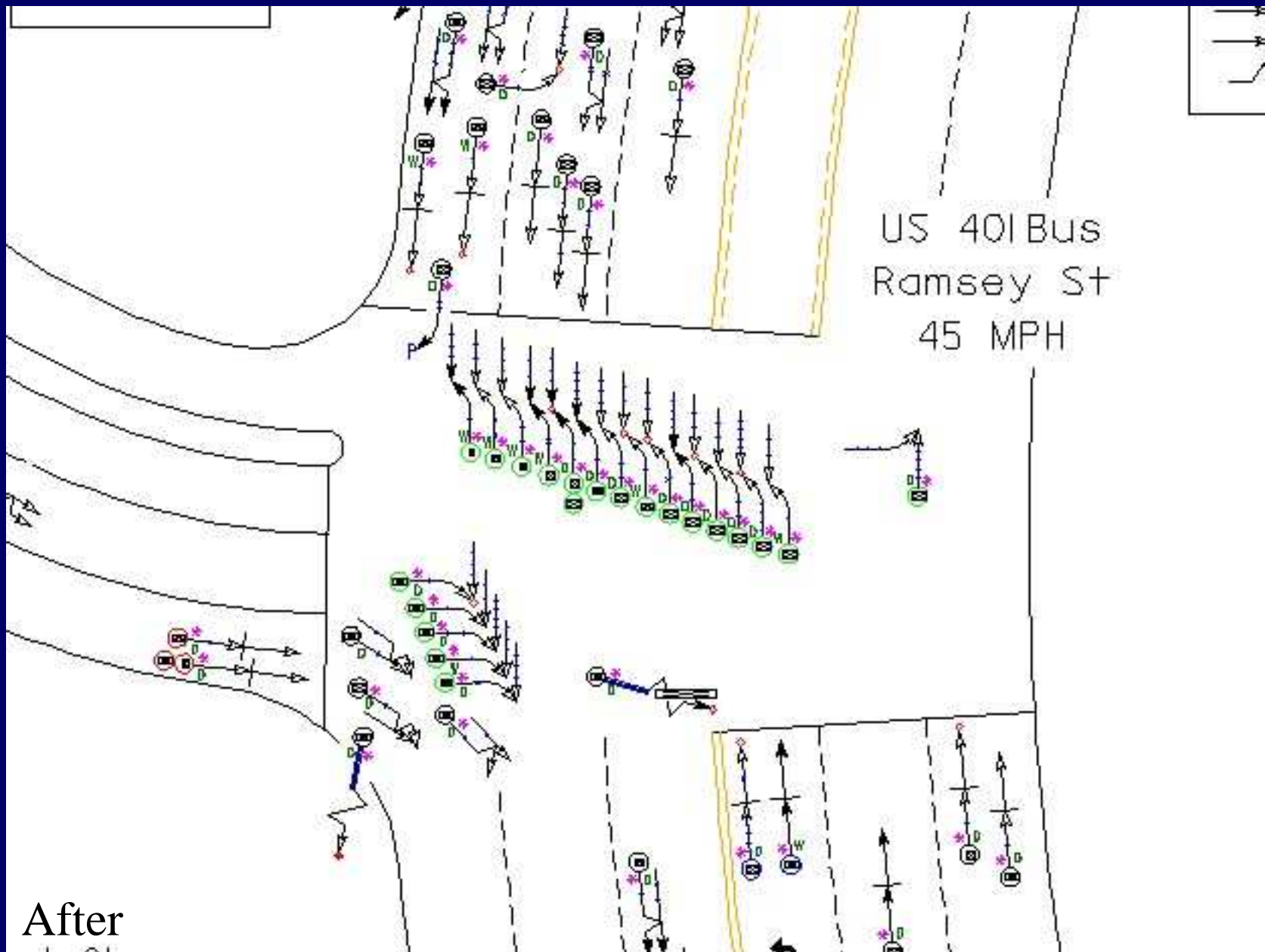


Traffic Signal Install - 2



Before

Traffic Signal Install - 2



After

Traffic Signal Install - 2

	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	78	62	- 20.51 %
Total Severity Index	5.08	5.47	7.68 %
Target Crashes 1 – Realignment	33	3	- 90.91 %
Target Crash 1 Severity Index	6.61	1.00	- 84.87 %
Target Crashes 2 – Lane Reassignment	9	2	- 77.78 %
Target Crash 2 Severity Index	5.11	4.70	- 8.02 %
Target Crashes 3 – New Signal	16	21	31.25 %
Target Crash 3 Severity Index	4.24	3.47	- 18.16 %
Combined Target Crashes	58	26	- 55.17
Volume	37,100	39,700	7.00 %

<u>Ramsey Left Turn: Same Roadway</u>			
Time of Day Analysis	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	9	15	66.67 %
Night / Early Morning (0000 – 0559)	0	1	100.00 %
Morning Rush (0600 – 0959)	1	1	0.00 %
Daytime (1000 – 1559)	2	6	200.00 %
Evening Rush (1600 – 1959)	4	4	0.00 %
Late Evening / Night (2000 – 2359)	2	3	50.00 %

Traffic Signal Install - 3

- Location:
 - NC 132 (College Road) and Bragg Drive in New Hanover County || SS # 03-00-205
- Problem Statement:
 - Pattern of angle and left turn crashes from motorists being unable to safely enter NC 132
- Countermeasure:
 - Install traffic signal
 - Cost: \$50,000
 - Project completion - January 8, 2002
 - 5 Years and 7 Months - Before and After Data

Traffic Signal Install - 3



Traffic Signal Install - 3

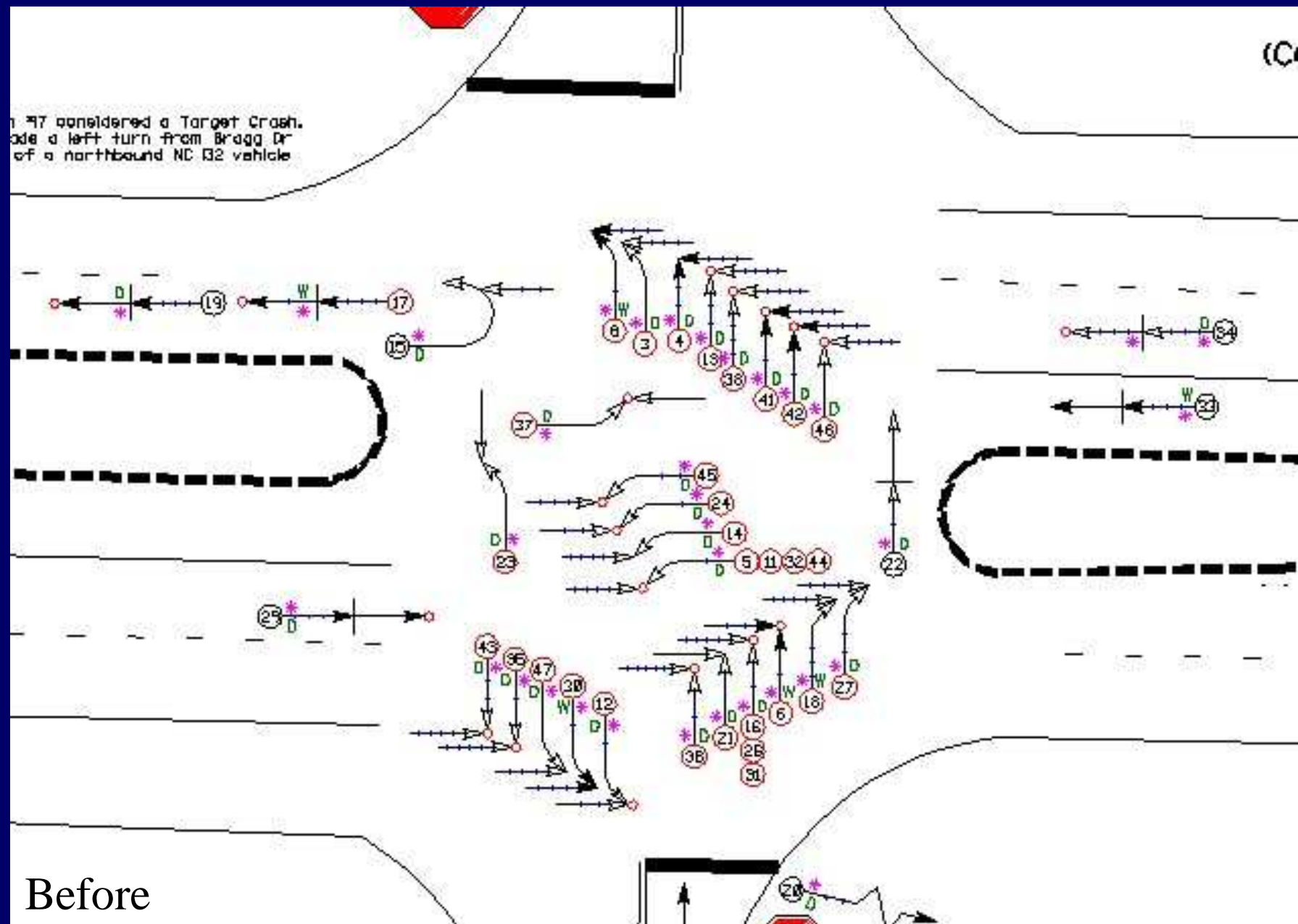
Looking North



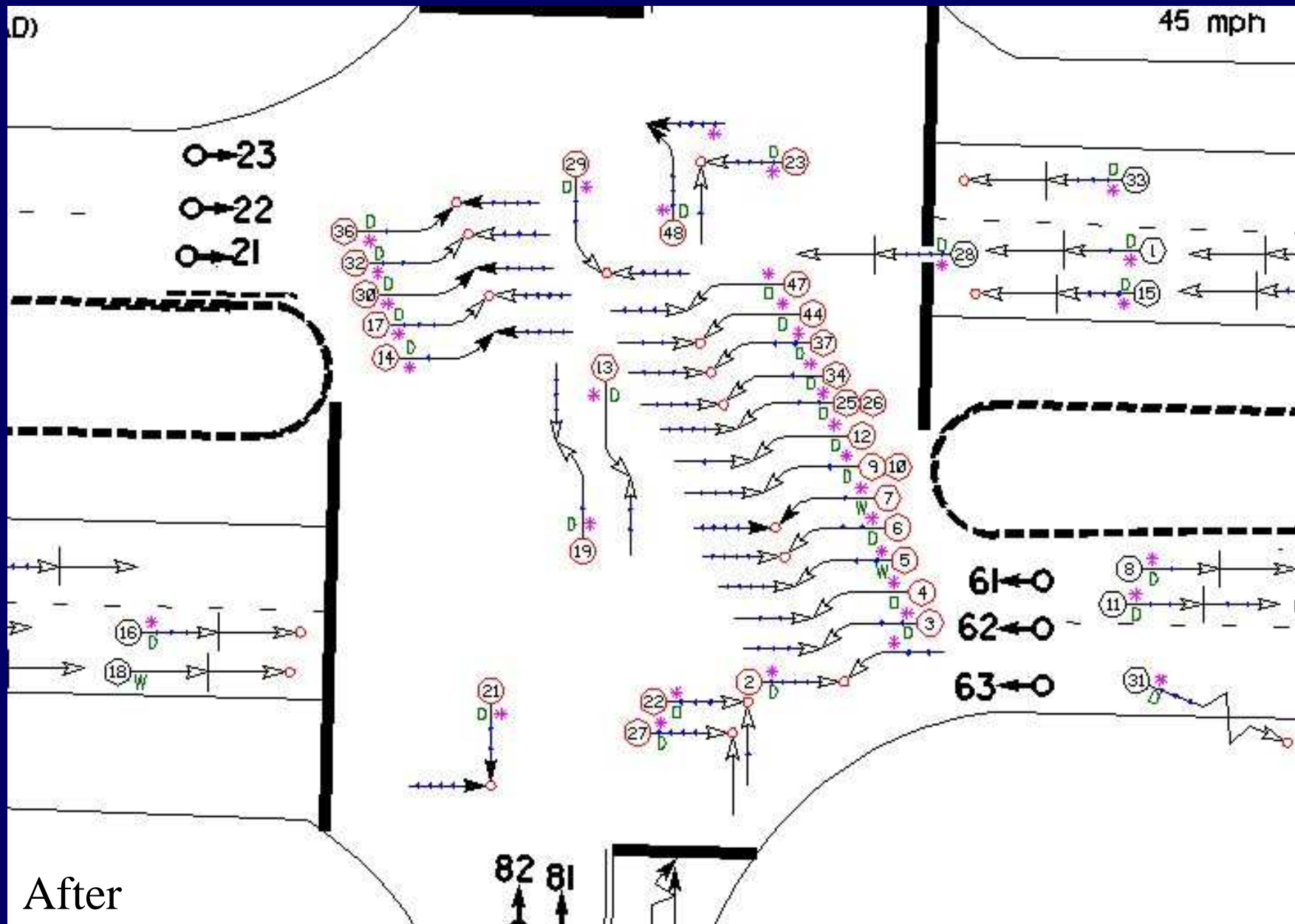
Looking South



Traffic Signal Install - 3



Traffic Signal Install - 3



Traffic Signal Install - 3

	Before	After	Percent Reduction (-) Percent Increase (+)
Total Crashes	47	48	2.1
Total Severity Index	8.16	6.93	-15.1
Target Crashes	30	28	-6.7
Target Crash Severity Index	10.49	9.59	-8.6
Volume	38,000	40,700	7.1

Evaluations on the Web

- 7 Project Evaluations
- 5 Work Zone Evaluations
- 324 Spot Safety Evaluations
- 32 Hazard Elimination Evaluations

Safety Evaluation Group - Completed Projects

Project Evaluations:	+
Work Zone Evaluations:	+
Spot Safety Evaluations:	+
Hazard Elimination:	+

<http://www.ncdot.org/doh/preconstruct/traffic/safety/ses/projects/completed.html>

Evaluations on the Web

Project Evaluations:

Preliminary Evaluation of 14 Roundabout Locations

- Preliminary Report

An Evaluation of the Effectiveness of School Zone Flashers

- Workplan
- Final Report
- Presentation

Work Zone Evaluations:

An Evaluation of Using Portable Changeable Message Signs (PCMS) to Regulate Speed Limit in the I-4913 Workzone

- Workplan
- Report
- Presentation

Evaluation of the Centerline Rumblestrip Installation on US 421 in Chatham County

- Brochure

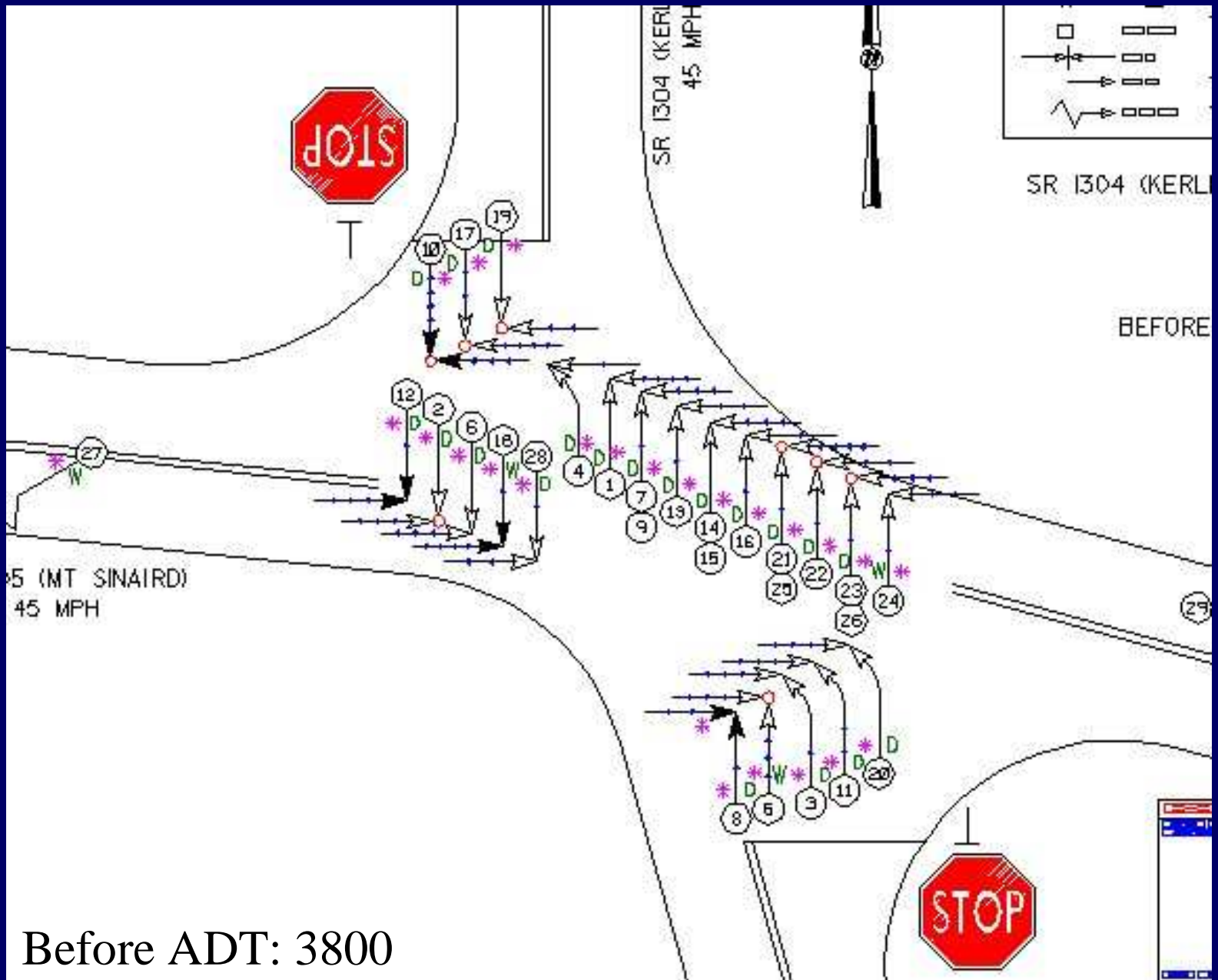
<http://www.ncdot.org/doh/preconstruct/traffic/safety/ses/projects/completed.html>

Future Evaluations in the Works

- Preliminary Evaluation of 4 Way Stop Installations
 - 12 of the 32 sites with at least 3 Years of Crash Data
 - Countermeasure: 4 Way Stop

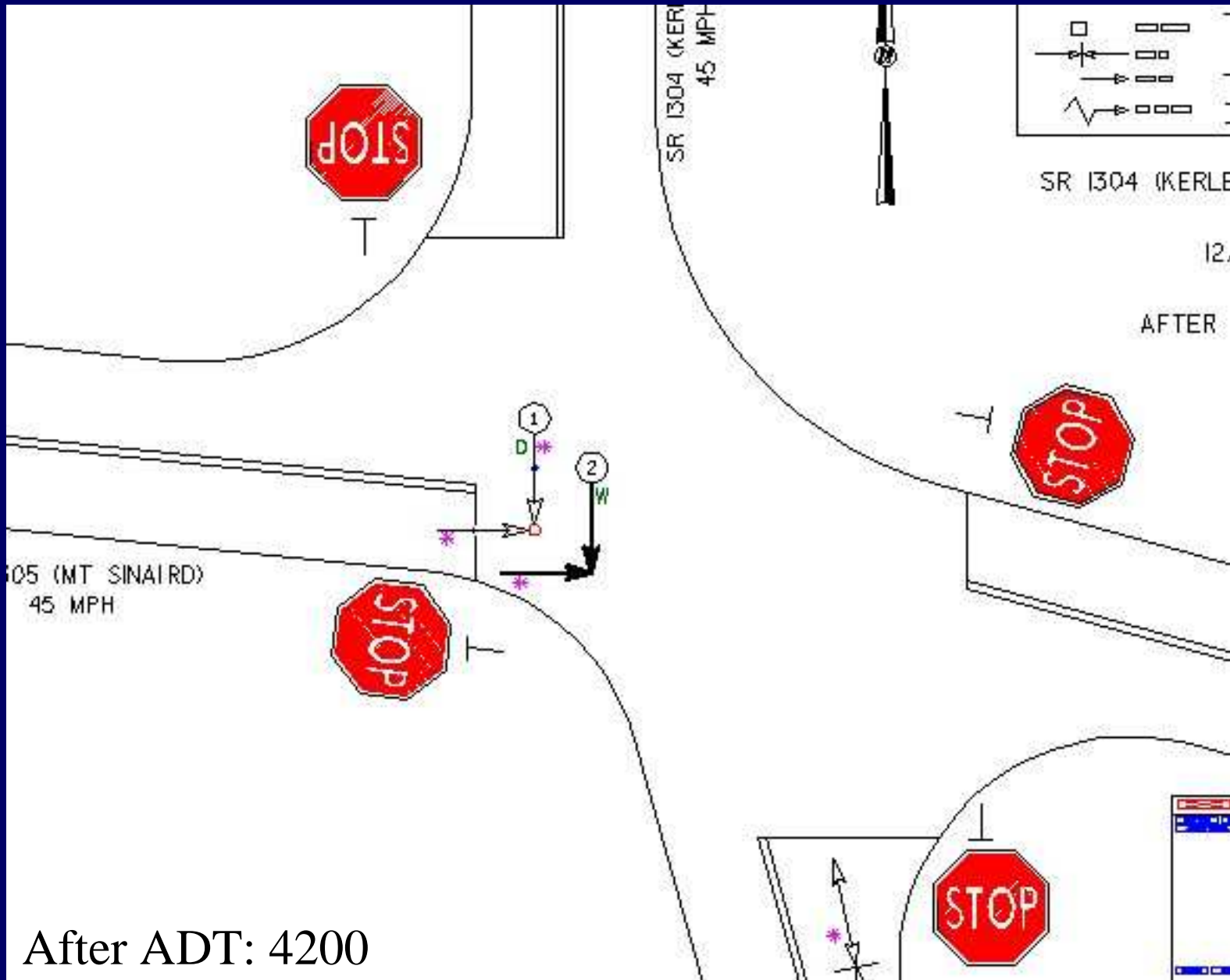
Site	Before Time Period	Before Total	After Time Period	After Total		Time (Yrs)	County	Location	Completion Date
1	4/1/91-6/30/99	36	12/1/99-2/29/08	27	-25.0	8.25	Wake	West at Jones	Late Summer/Fall '99
2	10/1/97-10/31/02	14	2/1/03-2/29/08	3	-78.6	5.08	Davie	SR 1147 (Salisbury St./Hardison St.) and Salisbury St. (NS)/S. Davie Drive (NS) in Mocksville.	12/2/2002
3	12/1/94-5/31/01	11	9/1/01-2/29/08	16	45.5	6.5	Pitt	SR 1700 (Old Tar Rd) at SR 1711 (Cooper Rd)	Jul-01
4	6/1/98-2/28/03	16	6/1/03-2/29/08	1	-93.8	4.75	Wake	SR 1931 (Harris Rd) at SR 1932 (Wall Rd)	4/29/2003
5	1/1/90-7/31/96	10	11/1/96-5/31/03	9	-10.0	6.58	Wake	SR 1301 (Purfog Rd.) at SR 2767 (Holland Rd.)	9/1/1996
6	1/1/90-7/31/98	29	12/1/98-6/30/07	3	-89.7	8.58	Durham	SR 1304 (Kerley Rd) at SR 1305 (Mt. Sinai Rd)	10/1998
7	12/1/92-5/31/00	20	9/1/00-2/29/08	3	-85.0	7.5	Gaston	SR 1112 (Bethany Rd.) @ SR 1106 (Freedom Mill Rd.)	7/1/2000
8	2/1/97-6/30/02	31	10/1/02-2/29/08	8	-74.2	5.42	Wake	SR 1909 (Purnell Road) and SR 1924 (Bud Smith Road)	8/7/2002
9	10/1/99-10/31/03	23	2/1/04-2/29/08	4	-82.6	4.08	Wake	SR 2005 (Honeycutt Rd) at SR 2007 (Brassfield Rd)	12/3/2003
10	1/1/90-9/30/95	23	1/1/96-9/30/01	10	-56.5	5.75	Pitt	SR 1725 at SR 1711	Nov-95
11	12/1/90-5/31/99	9	9/1/99-2/29/08	2	-77.8	8.5	Cleveland	SR 1809 (Double Shoals Rd.) @ SR 1811 (Rube Spangler Rd.)	7/27/1999
12	12/1/95-11/30/01	10	3/1/02-2/29/08	7	-30.0	6	Iredell	SR 1001 (Oswalt Amity Road) @ SR 2362 (Triplet Road)	1/9/2002
	TOTAL BEFORE	232	TOTAL AFTER	93	-59.9				

4 Way Stop



Before ADT: 3800

4 Way Stop



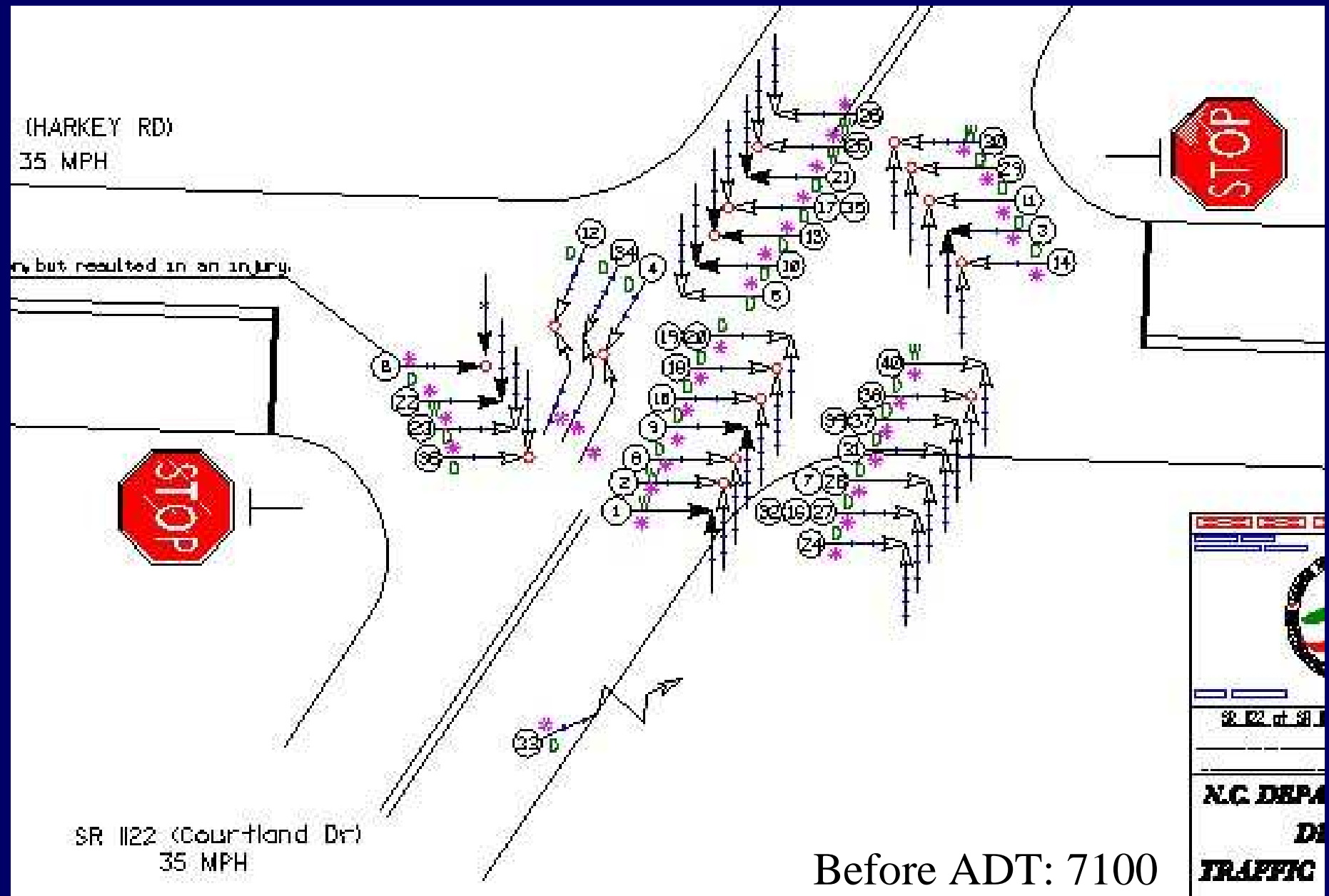
After ADT: 4200

Future Evaluations in the Works

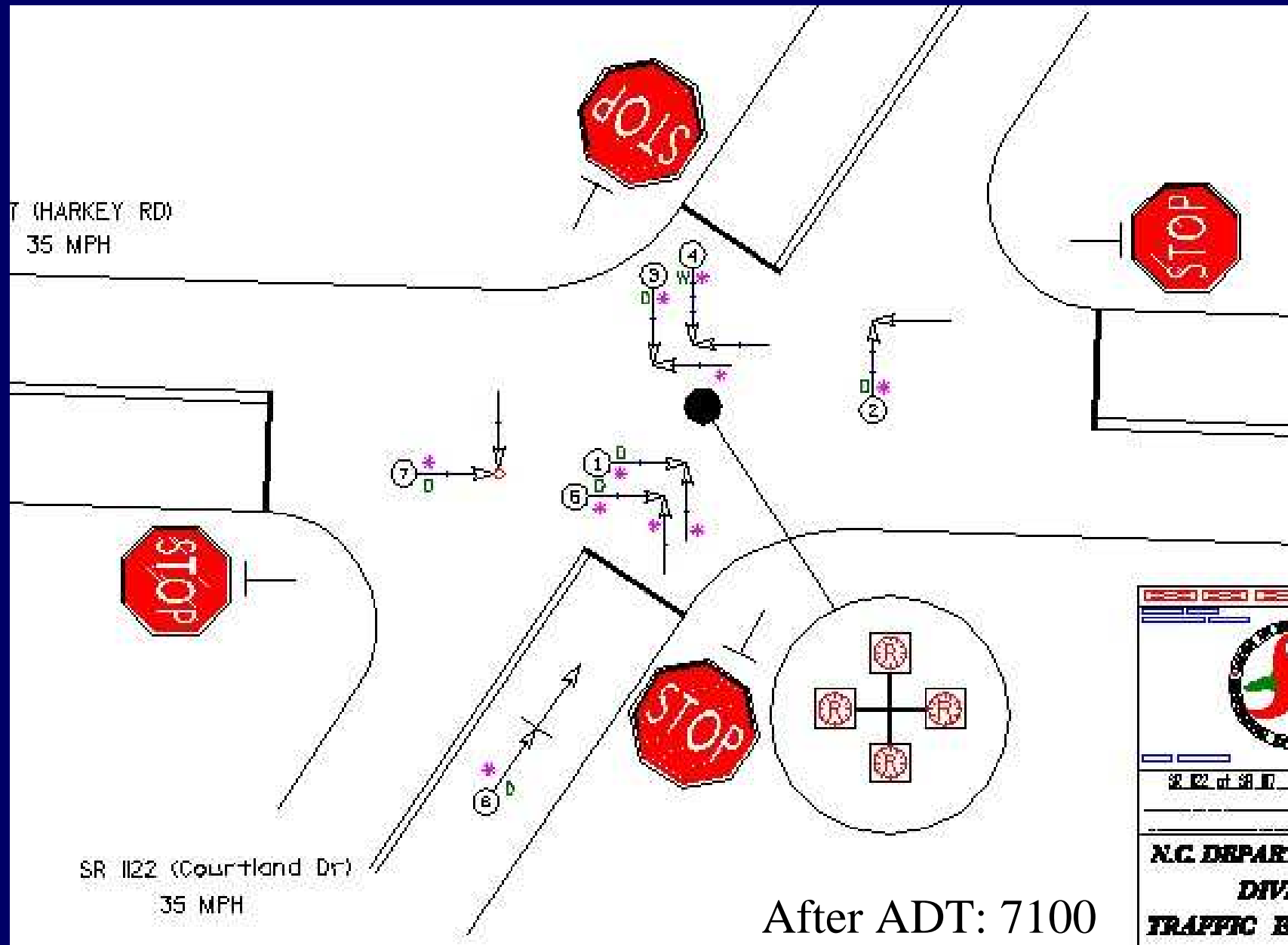
- Preliminary Evaluation of 4 Way Stop Installations
 - 6 of the 11 sites with at least 3 Years of Crash Data
 - Countermeasure: 4 Way Stop with Flashers

Site	Before Time Period	Before Total	After Time Period	After Total		Time (Yrs)	County	Location	Completion Date
1	4/1/98-1/31/03	40	5/1/03-2/29/08	7	-82.5	4.84	Lee	SR 1122 (Courtland Rd) at SR 1117 (Harkey Rd)	3/19/2003
2	12/1/99-11/30/03	31	3/1/04-2/29/08	14	-54.8	4	Franklin	NC 39 at SR 1770 (Old US 64)	1/15/2004
3	1/1/02-12/31/04	14	3/1/05-2/29/08	6	-57.1	3	Cumberland	SR 1006 (Clinton Rd) and SR 1835 (Rockhill Rd)	1/25/2005
4	12/1/00-5/31/04	15	9/1/04-2/29/08	1	-93.3	3.5	Randolph	SR 1558 (Hopewell Church Rd) at SR 1556 (Welborn Rd)	7/28/2004
5	1/1/90-3/31/94	24	7/1/94-9/30/98	6	-75.0	4.25	Wake	SR 1003 (Eagle Rock Rd) at SR 1007 (Poole Rd)	5/94 (Flasher: Fall 94)
6	10/1/96-1/31/02	33	11/1/02-2/29/08	5	-84.8	5.33	Robeson	SR 1001 (Shannon Rd) at SR 1505 (Old Lowery Rd)	3/26/02 (Flasher: 9/3/02)
TOTAL BEFORE		117	TOTAL AFTER	32	-72.6				

4 Way Stop with Flashers



4 Way Stop with Flashers



Future Evaluations in the Works

- Evaluation of Late Night Flash Policy Change
- Monitoring of Flashing Yellow Arrow Installations
- Signals with or without left turn lanes (2-lane apps)
- Potential Data Items for use in Evaluation Analyses
 - Crash Data
 - Speed Data
 - Volume Data
 - Vehicle Data
 - Pedestrian Data
 - Conflict Analysis
 - Observational Analysis

Spot Safety – Final Comments

TOTAL CRASHES									
Average Study Years	4.5	Total	(per year)	F	(per yr)	A	(per yr)	B	(per yr)
BEFORE Period Crashes		3796	853	23	5	125	29	446	100
AFTER Period Crashes		2917	657	15	3	54	12	300	68
		-----	-----	-----	-----	-----	-----	-----	-----
Difference from Before to After (Total Crashes)		879	197	8	2	71	16	146	32
Crash Cost* Savings		\$ 65,466,300	\$ 15,028,935	\$29,600,000	\$7,001,734	\$15,620,000	\$3,597,867	\$9,344,000	\$2,065,878
* 2003 Dollars									
TARGET CRASHES									
Average Study Years	4.5	Total	(per year)	F	(per yr)	A	(per yr)	B	(per yr)
BEFORE Period Crashes		2067	465	14	3	89	20	292	65
AFTER Period Crashes		976	221	10	2	32	7	148	34
		-----	-----	-----	-----	-----	-----	-----	-----
Difference from Before to After (Total Crashes)		1091	244	4	1	57	13	144	32
Crash Cost* Savings		\$ 50,360,200	\$ 11,534,963	\$14,800,000	\$3,602,815	\$12,540,000	\$2,838,918	\$9,216,000	\$2,022,536
* 2003 Dollars									
Original One Time Project Cost		\$ 7,744,000							
Number of Projects (Completed in 2002)		138							

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Traffic Safety Unit Website:

<http://www.ncdot.org/doh/preconstruct/traffic/safety/>